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Commodore
M A G A Z I N E

APRIL 1989, *Volume 10, Number 4*


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FEATURES

COVER STORY

COVER PHOTO: *Dennis Degnan*
Photograph displayed on monitor: ©1986, Woods Hole Oceanographic Institution
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REVIEWS

DEPARTMENTS

To John Iovine:

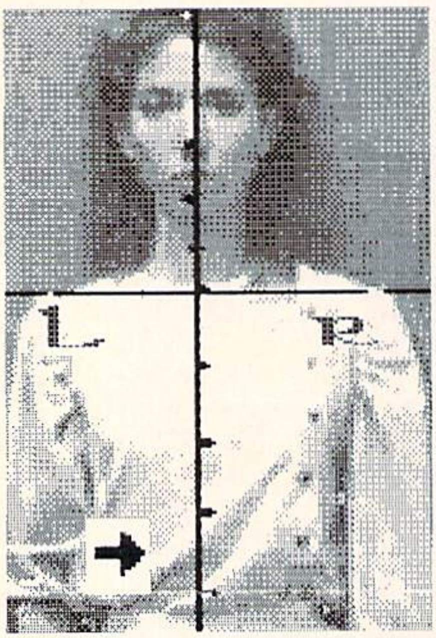
I read with interest your short project on Synchronicity (January 1989). I am involved in using the Amiga in projects like this in our Clinics. If you follow up with an EEG project please let me know.

We are using several Amigas in the Clinic for Iris Evaluations, Structural Shots from Video, X-ray Analysis, Electrical Therapy, Biofeedback, Electrical Acupuncture, Dark Field Microscope of Blood Urine and Tissue Samples, and Patient History with Dietary Evaluations.

We also operate an alternative Health College with ongoing reasearch projects on music and sound therapy.

Keep me informed of your projects. If you know of anyone else using the Amiga in this way, please have them contact me.

Sincerely,
James T. Weldon, Ph.D.
Healthworks Clinic
Longmont, CO



Editor's Note:

Anyone with similar interests can contact Dr. Weldon by writing to him c/o Commodore Magazine.

To the Editor:

I've been reading Graham Kinsey's column on Amiga public domain programs for some time and was wondering how I might obtain some of the disks you review. I own both a Commodore 64 and an Amiga 500 but don't own a modem or intend to buy or use one in the near future. I'm not very interested in using BBS's, but some of the reviews catch my attention like Walker in the January 1989 column. Any help would be greatly appreciated.

Sincerely,
Daniel Hoffmann
Addison, NJ

Editor's Response:

If the program is on the Fish series of public domain disks, it can be ordered directly from Fred Fish (see details at the end of the "Amiga Public Domain" column). You can order a catalog of non-Fish disks by writing to: SMAUG, c/o 1015 S. Quincy, Apt. 112 Quincy, MA 02169.

To Mark Jordan:

You have to realize that not everyone is or will be crazy about GEOS. It is only fair to tell your readers about this point before they spend their money on what could be (for them) a mistake.

I disagree with what you said about GEOS being the "way to go" for desktop publishing. *Paperclip Publisher* is also a good choice and one I think is superior because it isn't dependent on a big operating system that hardly leaves any room for a program.

That is what I think is the main problem with GEOS. When you program a word processor or paint program, you only put into it what you need. But with GEOS, you already have a large amount of your memory taken up, so any program you run has to resort to disk access.

Thank you for listening to my complaints. Despite our differences with GEOS, I like your other articles in *Commodore Magazine.* In my book anyone who is a good listener is doing his job right.

Sincerely,
Brandon Corfman
Findlay, OH

To the Editor:

In the "Best of" article in your December 1988 issue, you gave your readers the impression that I alone created *InterChange.* This is not the case. All along, Harriet Maybeck Tolly has been my equal partner in Syndesis. Her Intuition programming is behind the user interface of all our products. We work together in all aspects of the company. *InterChange* is as much her creation as mine.

Sincerely,
John Foust
Syndesis
Wilmington, MA

Address letters for publication to:
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1200 Wilson Drive, West Chester, PA 19380

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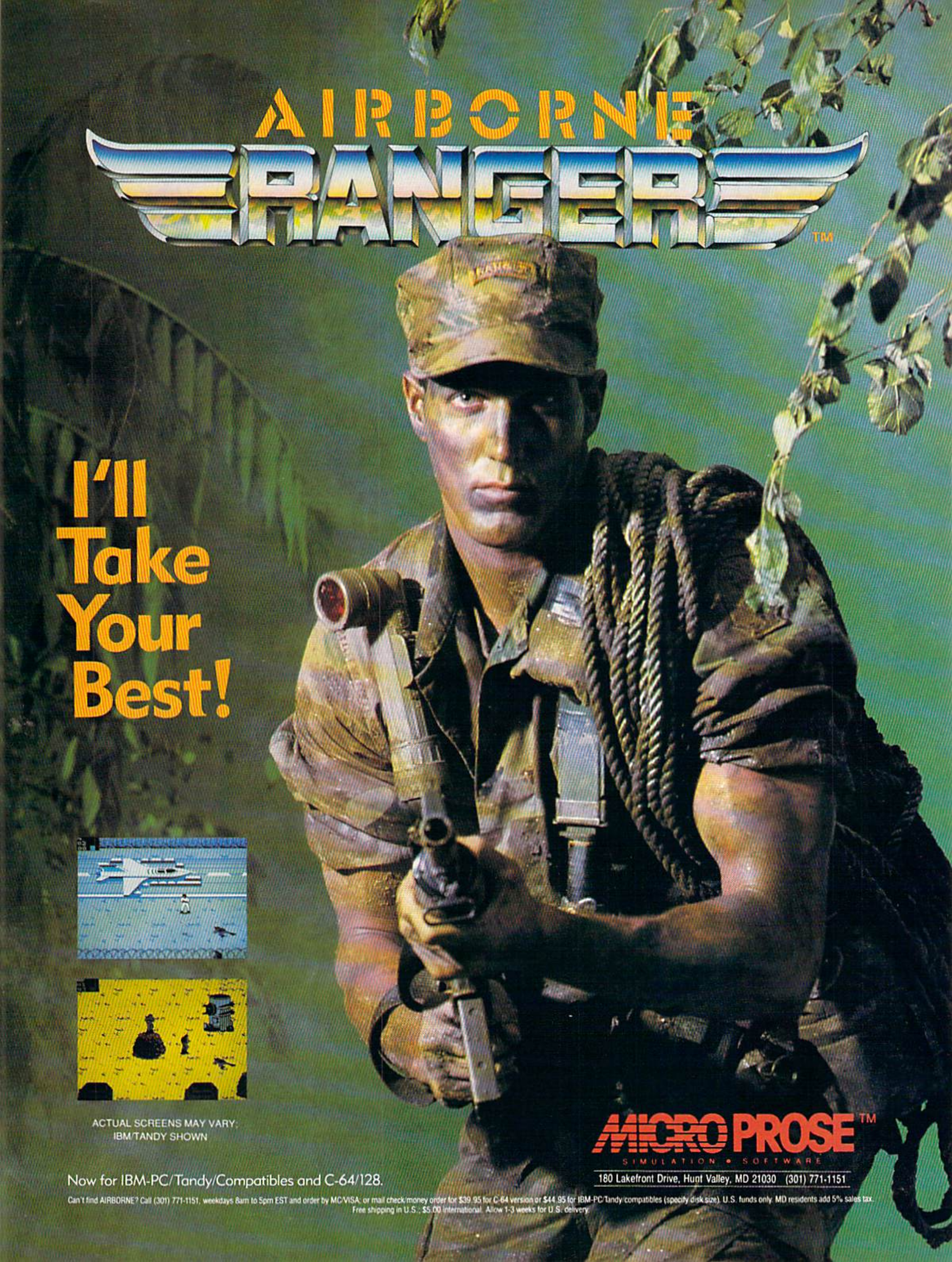
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New Titles Abound at CES

The hit of the show was HD-TV, but the 14,000 exhibitors gathered in Las Vegas were also touting such wares as a $4000 10th-anniversary Sony Walkman (with sheepskin ear pads) and a lighted showerhead for "recreational showering." The show, of course, is the bi-annual CES extravaganza. The major software companies also outdid themselves with new product announcements at the 1989 Winter Consumer Electronics Show held in Las Vegas January 7-10. Here's a round-up of the products unveiled for the Amiga and Commodore 64 at CES:



BOB CLARK

Epyx

Devon Aire in the Hidden Diamond Caper (Commodore 64: $29.95; Amiga: $49.95) is the first release in a new series of arcade adventures from Epyx. The game's protagonist, Devon Aire, is a reformed felon hired by a rich widow to locate a cache of family heirlooms hidden in her maze-like mansion.

Skate Wars (Commodore 64: $34.95; Amiga: $49.95) is Epyx's version of hell on ice. This futuristic fight to the finish combines hockey, soccer and war in competition against the computer or another player. **Skate Wars** is the first in a new line of Future Games software.

In **Undersea Commando** (Commodore 64: $29.95; Amiga: $49.95) you play a secret government agent based in an ultra-modern submarine. A deadly arsenal and sophisticated sensory devices are at your command to help you battle the "Yellow Shadow" bent on underwater domination.

Axe of Rage (Commodore 64: $34.95; Amiga: $49.95) casts the player as either the Barbarian or Princess Mariana on a journey of vengeance through four levels of mazes. You search the mazes for magical objects that will help you defeat your arch-enemy, Drax.

Trails of Honor (Commodore 64: $39.95; Amiga: $49.95) is the latest release in the Epyx Masters Collection for advanced game players. This medieval adventure challenges the player in a series of contests of physical strength and strategy to determine who will avenge the fallen monarch. Among the contests are sword fighting, arm wrestling, a dice game and slaying demons.

Curse Buster (Commodore 64 or Amiga: $29.95) is an action arcade game in which a prince and princess are being held under the spell of an evil sorcerer. They must get back to the palace amidst an onslaught of dragons, evil spirits and poisonous snakes. Their only weapon against this onslaught, believe it or not, is saliva. Yes, they must spit their way with unerring accuracy back to the palace.

For information on these releases contact: Epyx, Inc., 600 Galveston Dr., Redwood City, CA 94063. Phone: (415) 368-3200.

Mindscape

Hostage (Commodore 64: $29.95; Amiga: $44.95) puts you in charge of a six-person special forces team whose mission is to rescue inhabitants of your embassy who have been taken hostage by terrorists. Change your perspective instantly from the street to the roof to the recon team in the helicopter above.

Mindscape assures us that the competitions found in **Aussie Games** (Commodore 64: $29.95) are "authentic sporting events from Australia." Among the six unconventional challenges are shooting beer bottles open, a dry-river boat race (in which you carry the boat), and a belly-flop competition.

Combat Course (Commodore 64: $29.95; Amiga: $39.95) incorporates five levels of physical and strategic challenges to whip you into an advanced military machine. The game also offers a construction set option.

720° (Commodore 64: $29.95) takes you to Skate City where "virtually every surface is skateable." This skateboard simulation's piece de resistance is the dangerous move named in the title—a 720° spin (that's four times around and worth 500 points).

International Team Sports (Commodore 64: $29.95) lets you compete against athletes from 31 countries in five events: volleyball, water polo, soccer, swimming and track. Designed by Ed Ringler for Mindscape's SportTime line.

Two Mindscape sequels were also announced. **Balance of Power: The 1990 Edition** (Amiga: $49.95) is an update to the strategic superpower simulation. **Deja Vu II: Lost in Las Vegas** (Amiga: $49.95) finds you waking up in the bathroom of a cheap hotel wondering what you're doing there and how to get away from the mobster on your tail (a scenario that was actually carried out countless times during the four days of CES).

For further information on Mindscape products contact: Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. Phone: (312) 480-7667.

Continued on page 8

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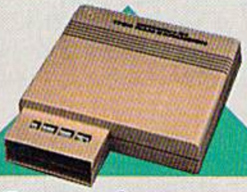


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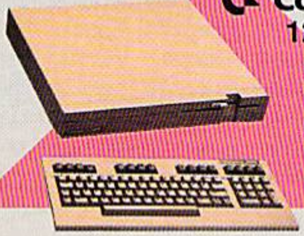
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MicroProse

MicroProse Software, Inc. announced the formation of Medalist International, a separate entity set up to distribute a variety of consumer computer products from outside developers. According to MicroProse president "Wild Bill" Stealey, "Through Medalist, distributors can order products they normally wouldn't see from MicroProse, which primarily produces simulation software." Three developers have signed with MicroProse; they are Software Simulations, Paragon Software and UK-base Hewson Consultants.

Paragon's graphic/text adventure **Twilight's Ransom** has been released for the Amiga ($29.95). The game includes 175 urban locations for the player to explore as he tries to save girlfriend Maria from the dastardly kidnappers.

Master Ninja: Shadow Warrior of Death (Amiga: $29.95) is a martial arts arcade game from Paragon Software in which the player must recover a magic sword stolen by an evil warlord.

Software Simulations has released the **1988 Tournament disk** for **Pure Stat College Basketball** (Commodore 64). This month they are scheduled to release **Pure Stat Baseball II** (Commodore 64), and in the fall **Pure Stat Football** (their first Amiga title) will be available. For information on these new products contact: Medalist International, 180 Lakefront Dr., Hunt Valley, MD 21030.

Taito

Operation Wolf (Commodore 64: $34.95; Amiga: price to be determined) is a hostage-recovery mission set in a jungle. You lead a commando-style raid against gunboats, helicopters, armored vehicles and enemy soldiers.

For more information contact: Taito Software, Inc., 267 W. Esplanade, Suite 206, N. Vancouver, B.C. V7M 1A5 Canada. Phone: (604) 984-3344.

Intracorp, Inc.

Search for the Titanic (Commodore 64: $34.95; Amiga: $39.95), Intracorp's second release in their Capstone line, simulates an underwater expedition to find the tragic remains of the luxury liner. (See cover story on page 52.) The program incorporates digitized pictures of actual photos of the *Titanic* taken by the Woods Hole Oceanographic Institution team who discovered it. **Search for the Titanic** includes over 75 shipwrecks, 100 navigational maps and 47 ports of call. For more information contact: Intracorp, Inc., 14160 SW 139th Court, Miami, FL 33186. Phone: (305) 252-9040.

Mediagenic

Parent company MEDIAGENIC's booth featured new releases from Activision, Rainbird, MicroIllusions, New World Computing and Interplay.

Just when you thought you'd seen the last Ninja, Activision comes up with **Last Ninja 2** (Commodore 64: $34.95). This action adventure sequel takes the player from Japan to the streets of New York, where he goes up against New York's corrupt police force using martial arts, swords, staffs, nunchuckas and shurikens.

F-14 Tomcat (Commodore 64: $39.95), Activision's recent release simulating a Naval Weapons Fighter School, was also being shown.

Neuromancer from Interplay should be available for the Amiga (price to be determined) by the time you read this. The game, based on William Gibson's cyberpunk novel of the same name, features a digitized soundtrack by DEVO. This role-playing adventure lets you determine your skills by plugging chips into head sockets. A Commodore 64 version is also available for $39.95.

Might and Magic II: Gates to Another World (Commodore 64: $39.95) is New World Computing's follow-up to *Secret of the Inner Sanctum.* Along with a party of up to eight characters you explore over 60 different areas in the mysterious world of Cron. The program features the "largest three-dimensional graphics window of any current fantasy role-playing game." Play increases in difficulty as you gain knowledge and power.

MicroIllusions has obtained the publishing rights to the Questmaster series. The Dondra Trilogy for the Commodore 64 (price to be determined) starts off the epic adventure. **Dondra—A New Beginning** will be the first release in the graphics/text adventure series.

Savage (Commodore 64: $29.95; Amiga: $39.95) from Rainbird Software is a multi-level arcade game set in a labyrinth of a castle and dungeon. The player must collect weapons and magical artifacts on his way through the castle to overcome the monsters and escape.

Rainbird also released two scenario disks for **The Universal Military Simulator** (Amiga: $49.95). The two disks ($19.95 each) are **The American Civil War: Scenario Disk One,** which covers Shiloh, Chattanooga and Antietam; and **Vietnam: Scenario Disk Two** including battles at Hill 823, Ngoh Kam Leat and Hill 875.

Elite (Amiga: $34.95) from Rainbird allows you to test your combat, navigational and entrepreneurial skills in five missions in outer space. Also available for the Commodore 64 ($14.95).

For information on MEDIAGENIC products contact: MEDIAGENIC, 3885 Bohannon Dr., Menlo Park, CA 94025. Phone: (415) 329-0500.

Dotronix, Inc.

Dotronix, Inc. announced the **Dot-X** Super VHS high-resolution monitor. The **Dot-X** model DSV20 is a 20-inch monitor that is compatible with the Amiga 500 and Amiga 2000. In addition to RGB analog, the DSV20 accepts standard NTSC and Super VHS Y and C video. With a resolution of more than 550 lines (more than twice a standard television), the DSV20 provides a clearer, sharper image than standard television, the DSV20 is expected to have a suggested list price of $799, which includes a custom Amiga video cable. For more information contact: Dotronix, Inc., 160 First St. SE, New Brighton, MN 55112-7984. Phone: (612) 633-1742.

Continued on page 10

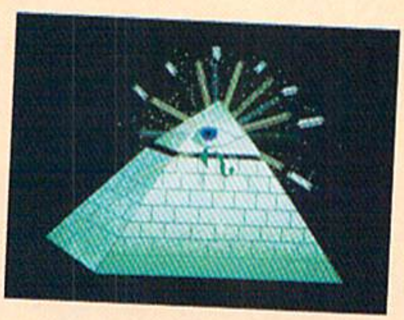
Continued from page 8

Amiga Graphics on PBS

This month Amiga-generated graphics will appear on the PBS show "New Television." The program features "Borders," a "political art video that combines documentary, dramatic, and interview footage, along with computer graphics generated on an Amiga."

The video was produced and directed by Merrill Aldighieri and Joe Tripician, who are hoping to "slaughter a few sacred cows" with their revealing look at the borders behind immigration, drugs and SDI. They used an Amiga 2000 with 3MB, **WordPerfect** to transcribe and edit interview material, **DeluxePaint II** to design over 50 IFF files, **Aegis Animator** to create moving graphics in the foreground and background, the **Magni 4004** genlock to output graphics from the Amiga to tape, and **TV*TEXT** for titling.





Star Wars

Broderbund has released **Star Wars**, an arcade game for the Commodore 64 and Amiga. Based on the movie and coin-op game, **Star Wars** features a 3D view from the cockpit and increasing levels of difficulty. As a bonus the packaging includes a computer chip that plays the **Star Wars** theme. Retail price for the Commodore 64 version is $29.95; the Amiga version sells for $39.95. For more information contact: Broderbund Software, 17 Paul Dr., San Rafael, CA 94903-2101. Or call: (415) 492-3200.

Jugg'ler-128

Herne Data Systems has introduced **Jugg'ler 128**. The program operates in the 128's CP/M mode to provide read, write and formatting support for over 130 types of MFM CP/M disks. The program supports all versions of 128 CP/M for the 1570, 1571 and 1581 disk drives as well as the 128D. With **Jugg'ler 128** the user can even analyze an unknown CP/M disk type to determine possible matches. **Jugg'ler 128** retails for $17.95 from: Herne Data Systems, Ltd., P.O. Box 714, Station C, Toronto, Ontario M6J 3S1, Canada. Phone: (416) 535-9335.

Wiz-Bang 128 Compiled

Wiz-Bang 128 is a pop-down menu word processor for the Commodore 128. **Wiz-Bang** originally appeared as a type-in program in the February 1989 issue of *Commodore Magazine* and is now available in a compiled version including a dictionary disk and additional features. For prices and information contact: Phillip Hughes, 11931 Pompton Drive, Houston, TX 77089.

Pen Pal

Pen Pal is Brown-Wagh Publishing's latest offering for the Amiga. The program, which B-W calls a "word processor/database/forms-generator," was developed for people who want high-quality black and white or color printed materials. **Pen Pal** includes a 100,000-word spell checker, mail merge and automatic generation of printed forms. The program's suggested retail price is $149.95. For further information contact: Brown-Wagh Publishing, Inc. 16795 Lark Ave., Suite 210, Los Gatos, CA 95030. Phone: (408) 395-3838.

Rampage

Activision's **Rampage** is now available for the Commodore 64. Licensed from Bally Midway, **Rampage** is a 3D monster-movie-style action game for one or two players. Each player becomes either a giant gorilla, a lizard or a wolf and makes his way across the country through 157 different cities and skylines. **Rampage** carries a suggested retail price of $34.95. For further details contact: Activision, 3885 Bohannon Dr., Menlo Park, CA 94025. Or call: (415) 329-0800.

Wayne Gretzky Hockey

Just in time for the Stanley Cup Playoffs, Bethesda Softworks has released **Wayne Gretzky Hockey** for the Amiga. The program is a realistic simulation of the game and includes real-time play, penalties, power plays, fights, sudden death overtime and instant replays. **WGH** also features a versatile system that allows you to play, coach or both, or you can let the Great One call the shots. The program retails for $49.95 (a Commodore 64 version is also in the works). For details contact: Bethesda Softworks, 15235 Shady Grove Rd., Suite 100, Rockville, MD 20850. Phone: (301) 926-8300.

3) BUBBLE BLOWING DINOSAURS.



The #1 game in Europe for 3 months. Scramble through 100 screens as your brontosaurus buddies, Bub and Bob, drive you crazy with non-stop action.

4) DEATH-DEFYING ACES.



Take the arcade's meanest air battle home for keeps. Strap in for explosive high-flying action. Hold on for your life as you soar through incredible graphics.

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6) OUTER SPACE GRID MONSTERS.



Don't settle for imitations. The game voted "one of the best home video games ever" by Electronic Game Player Magazine is ready to blast into your home.

7) RAGING STREET RUMBLES.



This is the original arcade hit. Thrill to the arcade quality graphics of this fast-paced, street-style karate brawl. Find out what real action is all about!

Taito games will make your Commodore scream with the sights and sounds of arcade action, adventure, survival, destruction, heroes, villains and heart-pounding thrills.

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Compiled by Louis F. Sander

Lou Sander's Tips & Tricks

This month's goodies emphasize simple programming techniques, powerful joystick routines and CP/M. Also included is another short but thrilling game from the Snaders of Baltimore. We've been stocking up on CP/M tips lately, so you'll see more of them here in the months to come.

If you like the "Tips & Tricks" column, you'll LOVE the *Tips & Tricks* book, which should be coming to market as you read this. Published by the Windcrest division of TAB Books, *Lou Sander's Tips & Tricks for Commodore Computers* is a "must buy" for every Commodore enthusiast. It contains every item from our first 30 columns, plus improvements, modifications and exciting new material. The book's 140 programs are also available on disk.

You can buy these treasures by mail or at your local book store; watch for the ads in this magazine.

To get into print yourself, send your tips to:

Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237

I read every submission, but I give preference to those that are printed or typed. Most successful submissions fit on a single, double-spaced sheet of paper; very few take more than two sheets. If your tip includes a program, you'll improve its chances by sending a disk as well as a printout.

As always, successful contributors get to see their name and work in print, plus a check for $10–$50.

Easy File Protection: If you want to save a program so you can prevent unauthorized access, save it with this syntax:

SAVE "filename,S",8 where "filename" is whatever name you have given to your program. Although it is a program, it will appear in the directory as a SEQ file, which may be enough to confuse unwanted snoopers. You, and others in the know, can load the program by using

LOAD "filename,S",8 This scheme may not deter determined hackers, but it's so simple it may throw them off the trail.

Juan Gonzalez
Inglewood, CA

Riotous REMs: If you know what you're doing, you can create REM statements that will make viewers stare in bewilderment. For example:

```
10 REMEMBER THE MAKER OF THIS PROGRAM.
20 REMARKABLE, ISN'T IT?
30 REMOVE THIS PROGRAM FROM YOUR COMPUTER.
40 REMIND YOURSELF NEVER TO LOOK HERE
   AGAIN.
```

The secret, of course, is to use words that begin with the letters R-E-M. The computer recognizes them as a REM statement. Your viewers may not. The technique is particularly powerful when used with others that disable the listing of your program.

To take maximum advantage of this tip, use a dictionary to find more words beginning with the letters R-E-M.

Amotz Zakai
Jerusalem, Israel

REMless REM: As long as a BASIC line will not be executed, it can contain just about any combination of characters, whether or not they are meaningful to the computer. You don't even need to begin it with a REM statement. For example:

```
100 GOTO 130
110 HELLO! MY NAME IS BAMBI.
120 I LIVE IN THE FOREST.
130 Rest of program goes here.
```

One character you can't use is the question mark. The computer will list it as the keyword PRINT. Shifted characters can also cause problems.

Louis F. Sander
Pittsburgh, PA

Simple Sound Effect: To add simple sounds to your programs, just toggle the volume between maximum and minimum with a routine like this:

```
10 FOR J=1 TO 25
20 POKE 54296,15
30 POKE 54296,0
40 NEXT J
```

The pokes to location 54296 turn the volume up and down, respectively, and the effect is that of a buzzer.

To vary the sound somewhat, insert a delay loop between turning the volume up and turning it down. When added to the above example, this line has a nice effect, turning the buzzer into a machine gun or motor sound:

```
25 FOR K=1 TO 30 : NEXT K
```

For different effects, change the 30 to other numbers between 0 and 200 or so.

Shultz Wang
Elmhurst, NY

Finding Screen POKE Codes: When programming, I often need to know the screen POKE code of a certain character. (That's the number you POKE into screen memory to cause that character to appear on the screen.)

Instead of looking it up in a chart, I find it easier to press the HOME key than type the character. I move the cursor to a blank line and enter:

? PEEK(1024)

The screen POKE code is then instantly displayed. This method comes in very handy when I need the screen POKE for a reverse field character. Unfortunately, it doesn't work in 80-column mode on the 128.

Kenneth Crews
Greensboro, NC

Better 128 Windowing: I love to put my menus into windows, using BASIC 7.0's easy commands. But there's a little problem with the [HOME HOME] sequence that is used to dissolve the window: in writing a complicated program, it's easy to create a [HOME HOME] sequence without realizing it. This can be a super headache to debug, as you can see from this illustration:

```
100 A$="[HOME DOWN DOWN] PRESS A KEY..."
110 WINDOW 19,5,59,15,1
120 PRINT "WHEN READY,[HOME]";A$
```

When line 120 executes, the [HOME] at the end of the quote-enclosed string is immediately followed by another one at the start of A$. Poof, there goes the window!

To eliminate the problem, I routinely insert a cursor movement command in front of all [HOME] commands. [LEFT HOME] is the form I generally use. When the statement is executed, the [HOME] immediately cancels any effect the [LEFT] may have had, and there is no longer any danger of a lurking [HOME HOME] sequence dissolving my window.

Robert B. Nixon
Woodland, CA

One-line Joystick Reader: We've gotten some of our best programming ideas from the "Tips & Tricks" column, so we'd like to offer one in return. The accompanying one-line joystick reader is one of our favorite techniques for creating short but action-packed programs. It increments or decrements variables A and B, depending on whether the joystick in port 2 is in the UP, DOWN, LEFT or RIGHT position. The "Joystick Reader Demo 1" program lets you exercise your joystick and see how the variables change.

"Joystick Reader Demo 2," usable only on the 64, includes a sprite that moves with the variables. For an interesting effect, change line 115 to read:

115 X=X+A : Y=Y+B

If that's too fast for your blood, slow it down by adding only a fraction of A and B, like this:

115 X=X+A/2 : Y=Y+B/2

Bob and Dave Snader
Baltimore, MD

```
10 REM ONE LINE JOYSTICK READER-SNADER
100 J=PEEK(56320):A=A+(J=123)
    :A=A-(J=119):B=B+(J=126)
    :B=B-(J=125)
```

```
10 REM JOYSTICK READER DEMO 1 - SNADER
100 J=PEEK(56320):A=A+(J=123)
    :A=A-(J=119):B=B+(J=126)
    :B=B-(J=125)
110 PRINT"[CLEAR]A=";A;"B=";B
120 GOTO 100
```

```
10 REM JOYSTICK READER DEMO 2 - SNADER
20 REM *** 64 MODE ONLY! ***
30 FOR J=832 TO 852:READ K:POKE J,K
   :NEXT
40 V=53248:POKE V+21,1:POKE V+39,14
   :POKE 2040,13:X=150:Y=150
50 DATA 255,255,255,128,0,1,128,0,1,
   128,0,1,128,0,1,128,0,1,255,255,255
100 J=PEEK(56320):A=A+(J=123)
    :A=A-(J=119):B=B+(J=126)
    :B=B-(J=125)
110 PRINT"[CLEAR]A=";A;"B=";B
115 X=150+A:Y=150+B
117 POKE V,X:POKE V+1,Y
120 GOTO 100
```

Joystick Driver: My "stick-on" Icontroller joystick has become one of the most important elements of my 128 system. I use it all the time with games, but when I return to BASIC to edit them, my hand still wants to use the joystick for moving the cursor. The Icontroller has expanded my keyboard, and there's nothing I can do except grow with it. The accompanying program lets me do just that.

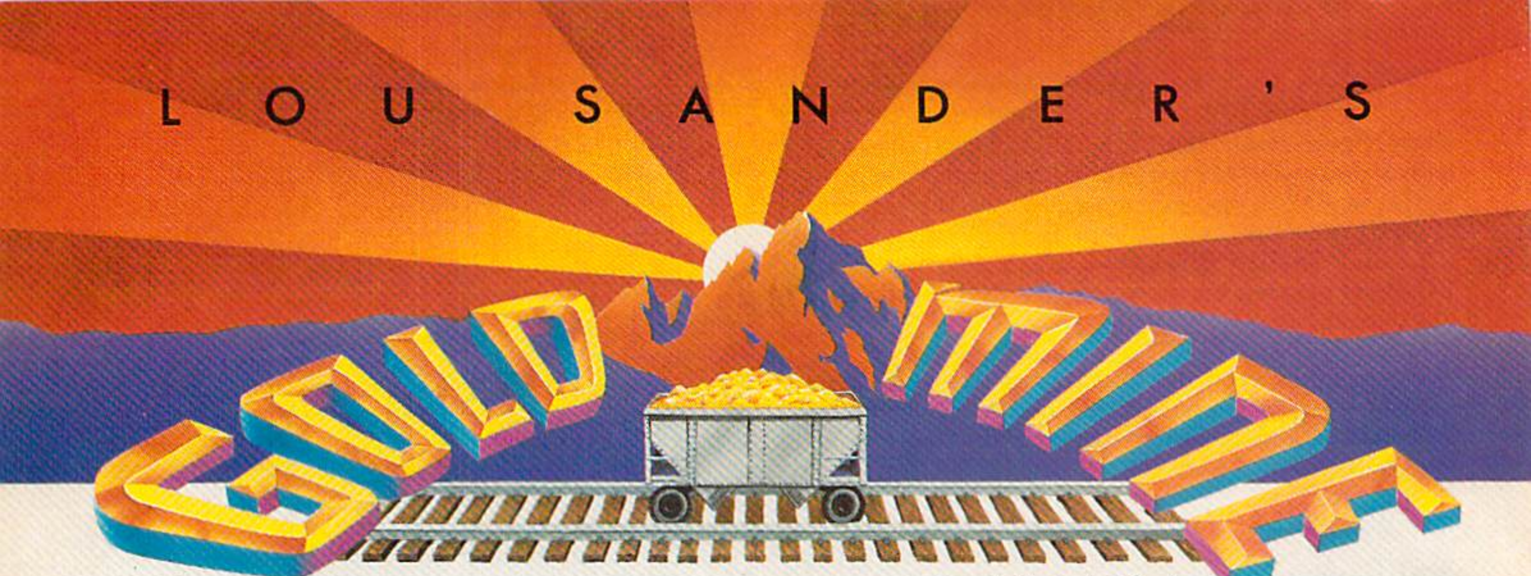
This joystick driver works with whatever you have plugged into port 2 on the 64 or 128, in 40- or 80-column mode. It lets your joystick move the cursor, with the fire button acting as a RETURN key.

The machine-language driver is relocatable to any area with 90 free bytes; just put this location into variable AD. Lines 15 and 20 allow different locations for 128 and 64 modes. Your first SYS call to this address will activate the driver; your second will toggle it off, as will simultaneously pressing STOP and RESTORE.

Chris Batchelor
Big Spring, TX

```
10 PRINT"[CLEAR,RVS,SPACE3]
   JOYSTICK DRIVER - CHRIS BATCHELOR
   [SPACE4,RVOFF]":PRINT"[DOWN2]
   WORKING...[UP3]"
15 AD=4864:REM RELOCATABLE START
   ADDRESS FOR 128
20 IF PEEK(65534)=72 THEN AD=832
   :REM RELOCATABLE START ADDRESS FOR
   64
25 FOR J=1 TO 104:READ K:CS=CS+K:NEXT
30 RESTORE:IF CS<>11098 THEN
   PRINT"ERROR IN DATA STATEMENTS!"
   :STOP
35 FOR J=0 TO 89:READ K:POKE AD+J,K
   :NEXT
40 IF PEEK(65534)=72 THEN FOR J=1 TO 7
   :READ K,L:POKE AD+K,L:NEXT
45 POKE AD+21,INT((AD+31)/256)
   :POKE AD+19,(AD+31)-256*PEEK(AD+21)
50 SYS AD:PRINT"[DOWN2]
   JOYSTICK #2 CONTROLS THE CURSOR.
   [DOWN]":PRINT"SYS";AD;"TO TOGGLE."
```

Continued on page 102



Compiled by Louis F. Sander

Here are some more great game tips for you. Many of them will work on any computer, whether it's from Commodore, Apple, Atari or IBM; others apply to only one machine.

Don't forget that many tips require skill as well as knowledge, and that since they apply to so many games and computers, we can't test every one.

Send your own Commodore game tips to:
The Gold Mine
P.O. Box 101011
Pittsburgh, PA 15237
Use a separate sheet of paper for each game, and combine all tips for one game onto one sheet. If your tip is printed, you'll get worldwide fame and a nice little five dollar grubstake. Gold Mine Rules!

Ace of Aces: When you are bombing the train or the U-boats, turn both engine RPM's to $4\frac{1}{4}$, and adjust the boost to $4\frac{1}{4}$. Then go back to the pilot's view and put your plane just above the horizon line, at an altitude of about 1000 feet.
Heath Morgan
Wahiawa, HI

Bard's Tale III: To get past Valarian's tower, you need a canteen or wineskin. After learning the GILL spell from the fisherman, go to the lake behind his hut. Enter the lake to get to the Crystal Palace; find the room with the water of life and use the skin to get some. Take the water and an acorn from the tree by the city to Valarian's tower where the stone disk is. Use the acorn, then the water; a tree will grow and lift up the stone. This gives you stairs to the final level and the Nightlance.
Howard Griffith
Bremerton, WA

Beyond Zork: If you don't know the answer to the riddle on the cliff wall, remember that the lightning's flash ends before its report.

This will help get the lost jewel out of the Jungles of Miznia: Hold the Wand of Eversion and the Lamp. Attack the baby Hungus in the quicksand, making the mother follow you in anger. Lead her to the Idol, but wait for her because she is slow. When she arrives, climb into the maw and wait for her to climb onto the bottom edge of the idol. Get the jewel and turn on your lamp after falling into the idol. Point the Wand of Eversion at the Idol. Go to the quicksand and point the wand at the mother Hungus, and there you have it!

You can get rid of the Dust Bunnies in the Lighthouse by bringing them the Bearskin Rug from the Tavern. Drop it, walk across it, and zap one of them by touching it. Be alert for an unexpected gift.
Patrick Presnell
Fort Washington, MD

Blue Max: You can get some extra points by flying under the bridges, at three or five feet above the water.
Mike Boone
West Chester, OH

Bop 'N Wrestle: If you body slam your opponent right away, all you have to do is kick him while he's down until all or most of his power is gone, then pin him. If he gets up before you've taken away all his power, just body slam him again and pin him. Be careful, the Champ is very tough!
Tom Schindler
Elyria, OH

Bruce Lee: On one of the levels after the one with three doors, there are two yellow Kung Fu symbols, each of which gives you an extra life. Most people think that because you get them once they disappear forever, but nothing could be further from the truth! If you leave the level and come back to it, they will be there again and again for up to nine times. Believe me, you'll need all nine of them for the upcoming levels.
Michael Gatto
Los Angeles, CA

Bureaucracy: The airport is a very confusing place, but there is a way out. Tell the controllers to stop Flight 42, then pull the red and black wires loose from the back of the speaker and connect them. The crowd will help you to your plane.
Aaron Maupin
Fresno, OH

Castle Wolfenstein: If you plan to continue your game after you are caught or killed, just turn off your disk drive after the game

boots up. Then when you are caught, just press the space bar and you'll be put back where you left off.
Josh Kelly
Spirit Lake, IA

Choplifter: Just for kicks, shoot all the hostages—it's pretty challenging and it polishes your flying skills tremendously.

Another fun thing is to set down at the first house and wait for the hostages to run to your chopper. When you lift off and move a half screen toward your own base, the hostages will eagerly follow you. Keep doing this and you'll find them sprinting to the base by themselves. I have "rescued" all the hostages this way without ever letting one board the chopper.

Here's yet another variation: Rescue the prisoners one at a time, and return them to base. With each trip back to base the airplanes become more numerous and skilled in dogfighting. Soon you will find up to six jets in a row chasing you around the landscape. It's terrific!

When flying in the air, always fly straight ahead. But when landing, land sideways. This makes it easier to land without squashing hostages beneath your chopper. Also try landing on top of a burnt-out house—your chopper will be filled in a matter of seconds.
Scott C. Illegible
Address Unknown

Defcon 5: If you're tired of dodging missiles at Defcon 3, move your orbital space weapon to the right side of the screen, about 2½ inches from the bottom. Then sit back and let the MTI destroy the missiles for you.
Gerry Tablada
New Carrollton, MD

Defender of the Crown: Always get Robin Hood's help before raiding a castle. This increases your chances of beating a stronger sword fighter. Note: Robin will only help you three times.
John McDaniel
Norfolk, VA

Gauntlet: If Merlin has under 200 health points left, let Death kill him. This will kill him and revive him with 9999 points. (This trick does not always work.)
John McDaniel
Norfolk, VA

Ghostbusters: When you get to a house with a ghost in it, place both men facing away from the trap. The ghost will start circling above the trap. Press the fire button and you've got him!

Also, if you're wondering how to prevent the Marshmallow Man from stomping over buildings, press "B" as soon as the bottom line clears for a Marshmallow Alert. You must have the bait for this.

Another way of capturing a ghost is to place one man about a centimeter away from the trap facing away from it, with the other man in the exact same place. The ghost will get stuck right above the trap. Press the fire button and you've got him!
Nelson Yung
Winnipeg, Manitoba
Canada

Ghosts N' Goblins: On the last level where you fight the giant worm-like creature, run as far as you can to the right as fast as you can. When you are there, face left and open fire. Everything will fly right through you and you'll win the game every time.
Omar Salinas
Address Unknown

The Hulk: I know just how frustrating it is when you can't get past the second room (the tunnel) in the dome. From the first room, type Bite Lip to get out of the chair. Go east into the tunnel and push the button. When you hear Time Delay On, Bite Lip again. This time you will get one move before gas fills the room. Type Go Outside and you're out! You can now move about freely as the Hulk.
Steven Gabaris
Flushing, NY

Interceptor: To complete the sixth mission, take off from your carrier and fly toward the enemy carrier. Keep your altitude above 20,000 feet, so you have room to outmaneuver enemy missiles. The instructions tell you to destroy the carrier, but all you have to do is shoot down all the enemy planes; about four of them will be launched at you, but not at the same time. Watch your stores, since shooting down four planes takes a lot of ammo.
Kyle Pearson
Kansas City, MO

International Karate: To get a head start on the first few levels on a one-player game, just stand still for a second and the computer opponents will fight each other. This way you only have to deal with one opponent instead of two.
Rob Abramowitz
Address Unknown

Jungle Hunt: To pause *Jungle Hunt* press the space bar.
Contributor Unknown

Kung Fu: Instead of bending down to punch or kick your enemies, then being bombarded by their airborne somersaults, simply leap over them as they come toward you. Not only does this keep you from suffering damage or losing a life, it also saves time!
Kevin Fite
Address Unknown

The Last Ninja: Saving your stars is not necessary because when you enter the Palace Gardens, more stars are near a flower bed close to the entrance.
Frozen Fire
Address Unknown

The Last Ninja: To get past the Dragon throw the smoke bomb right under him. With practice you'll hit and he'll cripple down.
Michael Epstein
Stony Brook, NY

Law of the West: Whenever you talk one of the gunfighters down and he starts to walk away, draw your gun and keep it on him until the next screen starts. There are some situations where he will draw on you late and at least one case where he'll enter the saloon then come out shooting.

The doctor, Miss April and Willie are the only characters who won't pull a gun on you. Any other characters are potentially dangerous.

Continued on page 110

Reviewed by Mark Cotone

Star Rank Boxing II

Computer: Commodore 64
Publisher: Gamestar
3885 Bohannon Drive
Menlo Park, CA 94025
Medium: Disk
Price: $14.95

Heads snap back in response to crushing jabs and uppercuts, with gut shots causing bodies to buckle in pain.



Think of boxing, and vivid images quickly come to mind: Ali's flicking jabs and verbal crosses, the red blur of a swarming Sugar Ray combination, or the frightening impact of a thunderous Tyson roundhouse. The vicious visual acts that unfold on the roped stage often seem so brutal and primitive that one frequently hears arguments aimed at removing the exhibition from the realm of "sports."

But on closer inspection we find that this center ring slugging is only a small part of an extensive, multilevel challenge; a public culmination of a long, private struggle. What goes unseen and often unnoticed are the months of planning and training that go into a fight, where true athletes work to prepare themselves mentally and physically for the upcoming assault. Strategy, strength, reflex, reason, cunning and courage are all needed to excel. Find a man who possesses all these attributes, and you have the makings of a champ.

Find a computer simulation that incorporates all these true-to-life features into a single contest, and you have the makings of a classic. It's called *Star Rank Boxing II* from Gamestar, and it's a heavyweight contender of a program that not only treats you to the compressed tension and excitement of a title bout, but also allows you to participate in the grooming and training of a boxer as well.

You begin the game in the role of manager. Unfortunately, in this computerized world of boxing, you're not afforded the opportunity to hang out in smelly, hot, sweaty gyms to scout for promising fighters. Too bad. But Gamestar offers a compelling alternative. Instead of discovering raw talent, you can create it. Simply decide on a name, race and weight division (Heavyweight, Middleweight or Welterweight) for your boxer, and the program will do the rest, instantly providing a full-screen rundown of your personal rising star, complete with physical specs (height, weight, reach and age) and career stats (wins, losses, draws, knockouts and rank).

Of course, all new boxers will start with the lowest ranking and a clean track record, but that will all change soon enough. If the proposed pugilist seems to have potential, he can be selected and saved to disk. And on the other hand, if you find a candidate unsatisfactory, he can be cancelled and the process repeated until a contender with the right stuff comes along.

Once you take a boxer under your wing, it's time to plan his entrance into the ring. If a challenger is to rise through the ranks, many believe the important factor is not so much *how* he fights, but rather *whom* he fights. Gamestar offers several options. First you must decide between Exhibition and Tournament play. The former is a good forum for learning the ropes, affording a boxer all the challenges of a tournament match without any of the pressures, since none of the results will count against his record. You can experiment with unorthodox moves, box outside a weight class, pick a fight with the current champ or even duke it out with a friend in the two-player mode. You have everything to gain in experience with nothing to lose.

If you decide on a Tournament bout, the consequences of your actions will weigh a little heavier. Your ultimate goal is to take a shot at the title, but it's a privilege that must be earned. Mistakes will not be tolerated, as a mishandled fighter with a poor record will never be offered a swing at the champ. Managerial decisions can be tough. Your boxer enters the circuit ranked sixth in a six-man division. Will you choose to take a slow methodical rise to the top, only squaring off against those next in line, or will you try to take the division by storm, skipping over the cellar dwellers and immediately setting your sights at the top? Either way, it's risky business.

Whatever route you choose, the next step is the all-important prefight preparation. Upon entering Gamestar's training camp, the player is informed of the number of scheduled rounds in the upcoming bout, as well as how many weeks he has to train. With this knowledge, a game plan must be devised. Four different training activities are offered to the boxer, each designed to hone a specific ability. The user now becomes trainer, first studying his fighter's skills, status and shape, along with the bout's parameters, and then allocating how much time—in weekly blocks—will be invested on each activity. There's the light bag, an agility and accuracy builder; the heavy bag, used to add power to the punch; sparing time, an all-around refiner; and running, a perfect exercise for building endurance. The numerous activity combinations available in camp are really the groundwork for a wide assortment of boxing theories. When your fighter steps into the ring, there will already be a relevant history behind him based on training techniques.

This is not a mindless rumble. These are individually-tailored athletes who promise a tough cerebral challenge expressed in physical terms, a hotly contested match rich with strategic possibilities and tactical depth. The winner will usually be the one who can out-think—not necessarily out-punch—his opponent.

Finally, it arrives: Fight Night. A hush blankets the crowd as both boxers stand ready in their respective corners. Nerves tighten, the bell sounds, and the bout begins. Viewing the action from a slightly

Continued on page 104

Tough Break For The Enemy!



ECHELON: 3-D Space Flight Simulation

ECHELON is the code name for a top secret military facility at the edge of our solar system. Your orders are to report to ECHELON to be trained to operate the 21st Centuries most advanced spacecraft, the C-104 Light Cruiser.

Once trained you must protect shipping and mining operations from attack by renegade pirate vessels who have terrorized commerce and are beginning to gain an upperhand.

Included in ECHELON is the LipStik™, voice activated control headset. Using the headset adds an entirely new dimension of realism to the simulation.

WINNER! Peoples Choice Awards — *RUN MAGAZINE*
"Outstanding sound and graphics . . . Fascinating depth." — *COMPUTE!*
"Takes space simulation to a whole new level . . . — *COMPUTER ENTERTAINER*

HEAVY METAL: Modern Land Combat!

Do you have the courage, skill and intelligence to move up the ranks in today's modern army? Here's your chance to find out.

Find yourself in a full simulation of an M1 A1 Abrams tank, the U.S. Army's most sophisticated and powerful main battle tank.

Or how about behind the wheel of an XR 311 FAV (fast attack vehicle) going over 100 mph attacking enemy supply depots. Trying to defend your supply stations is going to be less difficult using an ADAT (air defense anti-tank) system, but it will never be easy. You'll face a challenge you never expected to get in OTS (Officer's Training School). Add to this the fact that battles are going on at three different fronts at once and you'll soon find out what you're made of. Do you have what it takes? TAKE THE HEAVY METAL CHALLENGE TO FIND OUT!


Enemy Spacecraft moving in for the kill!


Explore the ruins of an ancient civilization!

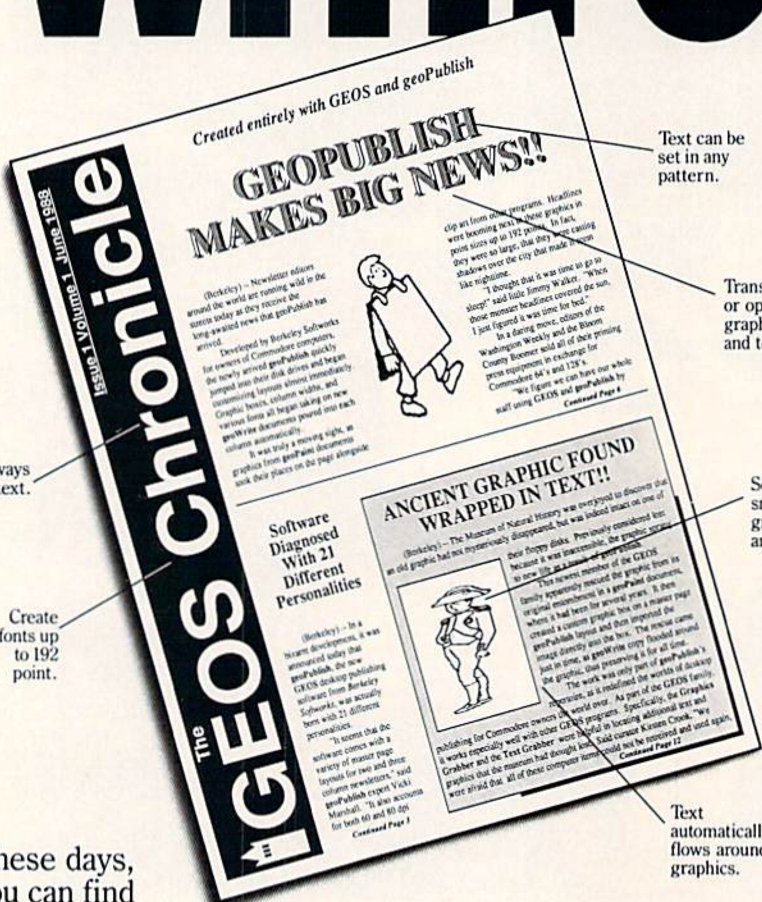
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Inside view of your M-1 Abrams Main Battle Tank


The Tactical Command Display (TACC) allows you to plan your strategy.

WE SCOOPE
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These days, you can find all kinds of programs that call themselves desktop publishers. Oh, one may drop a drawing here or create a column there. But don't let anyone kid you.

Nobody's got anything like geoPublish.

You see, geoPublish is a real desktop publisher. With hundreds more features that unleash your layouts across an endless number of pages, and leave your non-GEOS friends frenzied with frustration.

"Full featured desktop publishing on the Commodore 64? Including laser printing? If I hadn't seen it with my own eyes on my own Commodore 64, I wouldn't have believed it, either."

—MicroTimes, March, 1988

With geoPublish, you pour your geoWrite text into columns and around graphics. Automatically. You can use any of the 21 preset page layouts or any of the zillions you come up with yourself.

After that, it's off to fun city.

The geoPublish toolbox is filled with goodies that help you create all kinds of special effects in almost every area. for example, you can customize over 80 GEOS compatible fonts. In bold, italic, underline, or outline. In any combination you choose. Up to 192 points high.

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—RUN, March 1988

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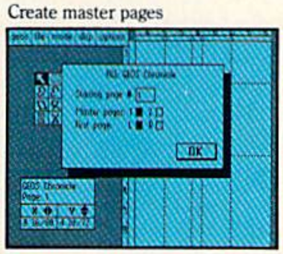
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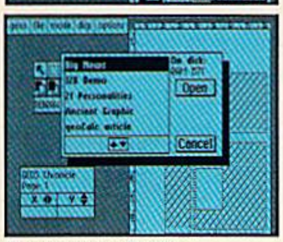


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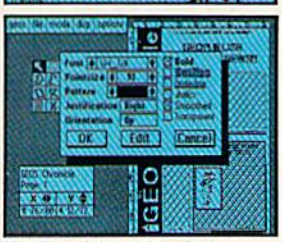


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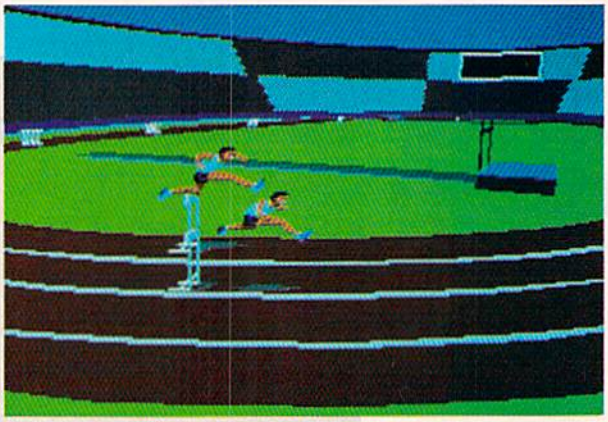
GEOS COMPATIBLE



Reviewed by Scott A. May

The Games: Summer Edition

Computer: Commodore 64
Publisher: Epyx, Inc.
600 Galveston Drive
Redwood City, CA 94063
Medium: Disk
Price: $39.95



The latest installment in the Epyx *Games* line is the best. Absolutely. No, really, this time we mean it.

By now it must sound like a broken record: The latest installment in the Epyx *Games* line is the best. Absolutely. No, really, this time we mean it.

Considering there are now seven games in the series—with no end in sight—such accolades might seem tedious if not for one small fact: it's true. If these games get any better, the next Olympic trials might be held on a computer terminal.

The Games: Summer Edition pays rich tribute to the 1988 Olympic Games held in Seoul, South Korea. If your country didn't do as well as expected, here's your chance to set the record straight.

Up to eight players can compete or practice in the eight featured events. Unlike other games in this series, both the contestants' names and the countries they represent are saved to disk. The most recent lineup automatically appears each time you load the game. More than one player can select the same country when competing as teams.

The eight events are: Springboard Diving, Uneven Parallel Bars, Rings, Hammer Throw, Velodrome Cycling, Hurdles, Pole Vault and Archery. These are completely new designs, among the finest yet in the Epyx *Games* library.

Diving

This event features much-improved graphics and animation from the similar contest in the original *Summer Games*.

The greatest improvement, however, is the ability to design your own routines. Rather than adhering to stringent guidelines, players are afforded the freedom to pretty much do as they please.

The manual gives detailed instructions for performing 16 basic forward and backward moves. Through careful joystick manipulation and perfect timing, dozens of complex dives are possible. The manual lists twenty, but many more await your imagination.

Other nice touches in this event include an adjustable springboard and some rather painful comic relief. Jump too soon, for example, and you might land head-first on the end of the board. Release from your tuck too late and prepare for a solid belly flop. Either scenario leaves you with a sinking feeling—straight to the bottom of the pool.

Archery

This event is both easy to learn and play thanks to skillful design and execution. Stunning visuals keyed with smooth joystick controls produce a remarkably life-like simulation.

Players are given 90 seconds to get off three shots. In the first screen, pull back on the bow and adjust the tension. A second screen allows you to sight the target with crosshairs. A windsock indicates the power and direction of the wind.

Novice archers should wait a reasonable amount of time for lulls in the wind. When the sock goes limp, fire away. The real challenge, however, involves exact compensation for the wind. Use peripheral vision to watch the sock for favorable wind conditions. Experienced players can draw, aim and fire in a single effortless motion. This is a fun event, containing a fair amount of both skill and luck.

Velodrome Cycling

Plug in an old joystick before attempting this exciting one- or two-player contest. Manic wrist movements constitute cruel and unusual peripheral punishment.

This head-to-head event takes place on an indoor track with wide, banked curves. The screen is divided into three sections: a rear 3D perspective, an overhead view of the track, and fatigue bars for each player.

The object is to jockey for position and maintain an easy pace for two laps. "Drafting" your opponent—riding the airstream directly behind his cycle—is the best method to preserve your strength.

At the start of the third and final lap, tear up the track—and thus, your joystick—in a mad scramble for the finish line. It's a wild ride that'll leave you exhausted.

The joystick-busting controls consist of a simple up-down motion. The faster you jiggle, the faster you pedal. In the heat of the final lap, most players will have a hard time keeping a straight face as they flail madly on their poor joysticks. Simple, but lots of fun.

Hammer Throw

The graphics, animation and humor in this solo event are by far the best of the entire Epyx series. This is one you must see to believe.

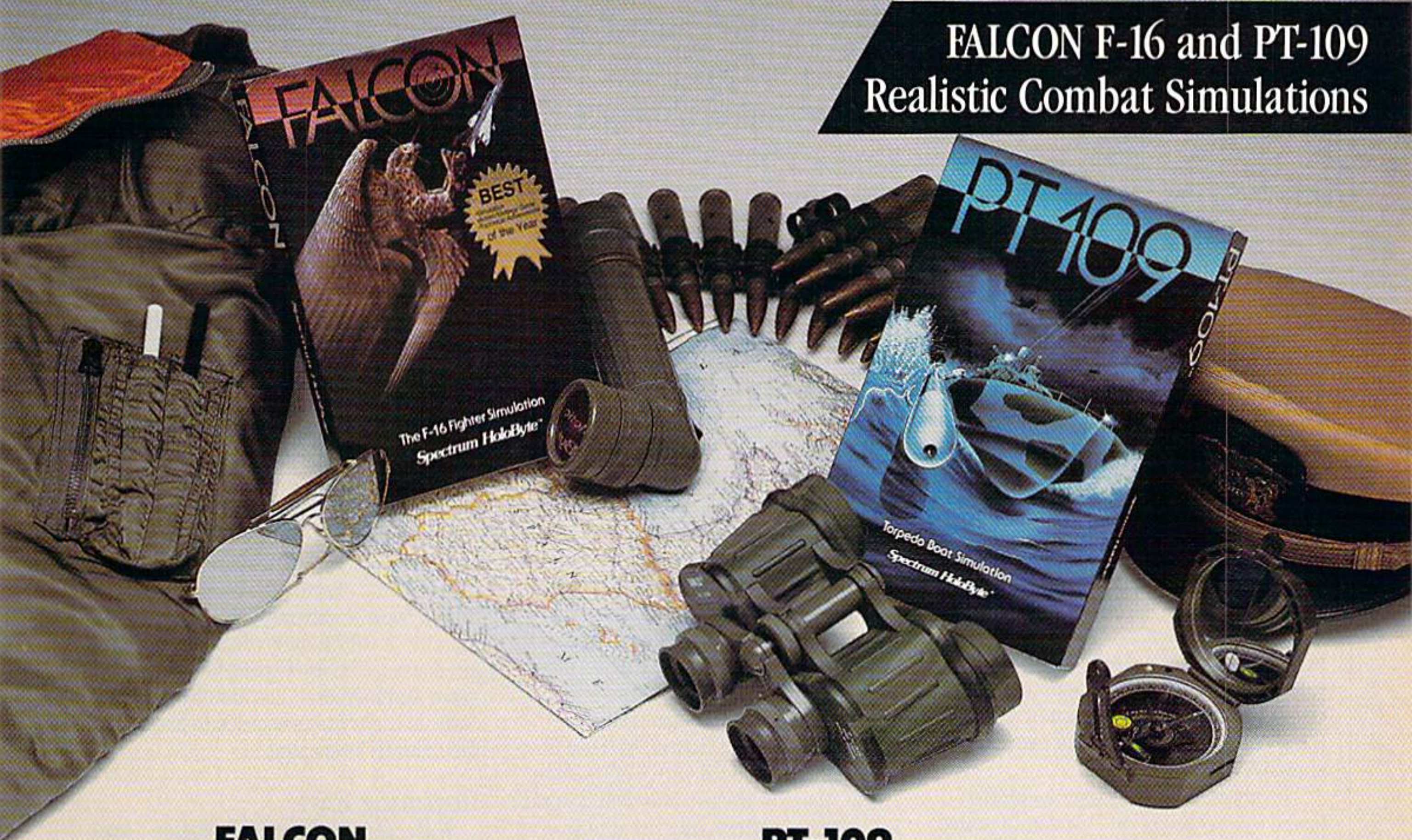
The "hammer" is actually a large weighted ball attached to a steel chain. Athletes compete for distance as they swing and throw the hammer down a measured field.

Players initiate the overhead spin cycle with a press of the fire button. Rotating the joystick counterclockwise increases the speed of the spin. At the desired velocity, press the fire button again to enter the revolve stage. Here the on-screen athlete rotates with his entire body and approaches the release circle. A final press of the button sends the hammer sailing, hopefully down field.

Continued on page 101

EXPLOSIVE ACTION!

FALCON F-16 and PT-109 Realistic Combat Simulations



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Jeffrey Sullivan, MacWorld.

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FALCON Available on IBM, Macintosh, Amiga, and Atari ST. PT-109 Available on IBM, Macintosh, and C-64.

Reviewed by Russ Ceccola

Super Aide

Computer: Commodore 64
Publisher: Free Spirit Software, Inc.
P.O. Box 128
58 Noble Street
Kutztown, PA 19530
Medium: Disk
Price: $29.95

I think that you'll pick *Super Aide* as your first choice among utility programs for its speed alone.

Super Aide's packaging includes an impressive list of features; and the program really lives up to these claims. Over 40 features are listed on the back of the package. I tested each one and verified that they are included in the program. *Super Aide* is quite simply one of the finest programming utility products available for the Commodore 64.

As a programmer for an electric company, I mainly use FORTRAN for my work, but I've played with BASIC in high school and on all of my Commodore computers (64, 128 and Amiga 500). So my experience with BASIC is extensive enough to test what is billed as a programming aid. To test *Super Aide* I wrote a simple BASIC program.

The program displays some graphics (some color changes and randomly-placed dots), makes some noise (via the SID), and crunches some numbers (to randomly pick values for the variables needed in graphics and sound). I constructed the program in such a way that some lines are repeated, and there are duplicate commands throughout the lines to test *Super Aide*'s search abilities and make traversing through the lines easier.

Here's how *Super Aide* did in 11 areas:

Syntax Error Wedge Commands and Editing Necessities

Super Aide "hides itself" in areas of memory you normally wouldn't access. In particular, the syntax error wedge commands and the non-maskable interrupt (NMI) commands are always loaded into memory. The machine-language (ML) monitor can be loaded into two different memory locations, and the lo-res screen editor can be loaded into one location. Options to load the ML monitor and screen editor are given when *Super Aide* is first loaded. After exiting the introduction screens and returning to BASIC, the syntax error wedge commands and NMI commands are available for your use.

The syntax error wedge commands are those two- or three-key command sequences that mean nothing to Commodore BASIC, but are useful commands for the wedge put in memory by *Super Aide* to interpret. These commands cover such things as getting directories with one keystroke, accessing disk drives, loading BASIC and ML programs, auto-numbering a BASIC program, deleting or inserting line number ranges, validating and initializing disks, copying programs, executing searches and changes in the program with line ranges and appending BASIC programs from disk to the one currently in memory. Even more options are available—keep in mind that all of these functions are not included with Commodore BASIC and are instead only found in utility packages. After using the syntax error wedge commands, you'll find them editing necessities for future programming.

Non-Maskable Interrupt Commands

These commands are accessed by pressing the RESTORE key on your keyboard. After hitting RESTORE, the computer freezes and instantly attends to the NMI command you are about to give.

Some of the options you can use after hitting the RESTORE key follow. (These are single-keystroke commands that instantly respond to your key press unless further information is required to execute a command.) After hitting the RESTORE key, you can easily change border, background and character colors; turn printer echoing on and off; reset your computer; access a trace function (that works well); call up help screens for both NMI and syntax error commands; view a record in a relative file; perform a FRE(0); enter the ML monitor or screen editor and more.

You'll find that the NMI commands are aimed more toward setting up your programming environment than the wedge commands, which are used mainly for manipulating your data and programs. The natural separation of the two types of commands is obvious if you examine both help screens right after another. You will use the NMI commands less frequently, but their power is more obvious. In particular, you can call for number conversions of hexadecimal, binary or decimal numbers with one NMI command.

Machine Language Monitor

The ML monitor that comes with *Super Aide* is X-Mon 64, the most popular and easy-to-use public domain ML monitor for the Commodore 64. It has all of the options necessary to examine a BASIC program from an ML standpoint. You can hunt memory for occurrences of bytes, compare memory locations, assemble or disassemble code, display areas of memory, transfer memory, display essential registers and execute the program in steps from a specific starting point. The ML monitor is very handy when you want to get down to the nitty-gritty of your program and memory allocation by *Super Aide*. It is easy to use, quick to learn and functionally important.

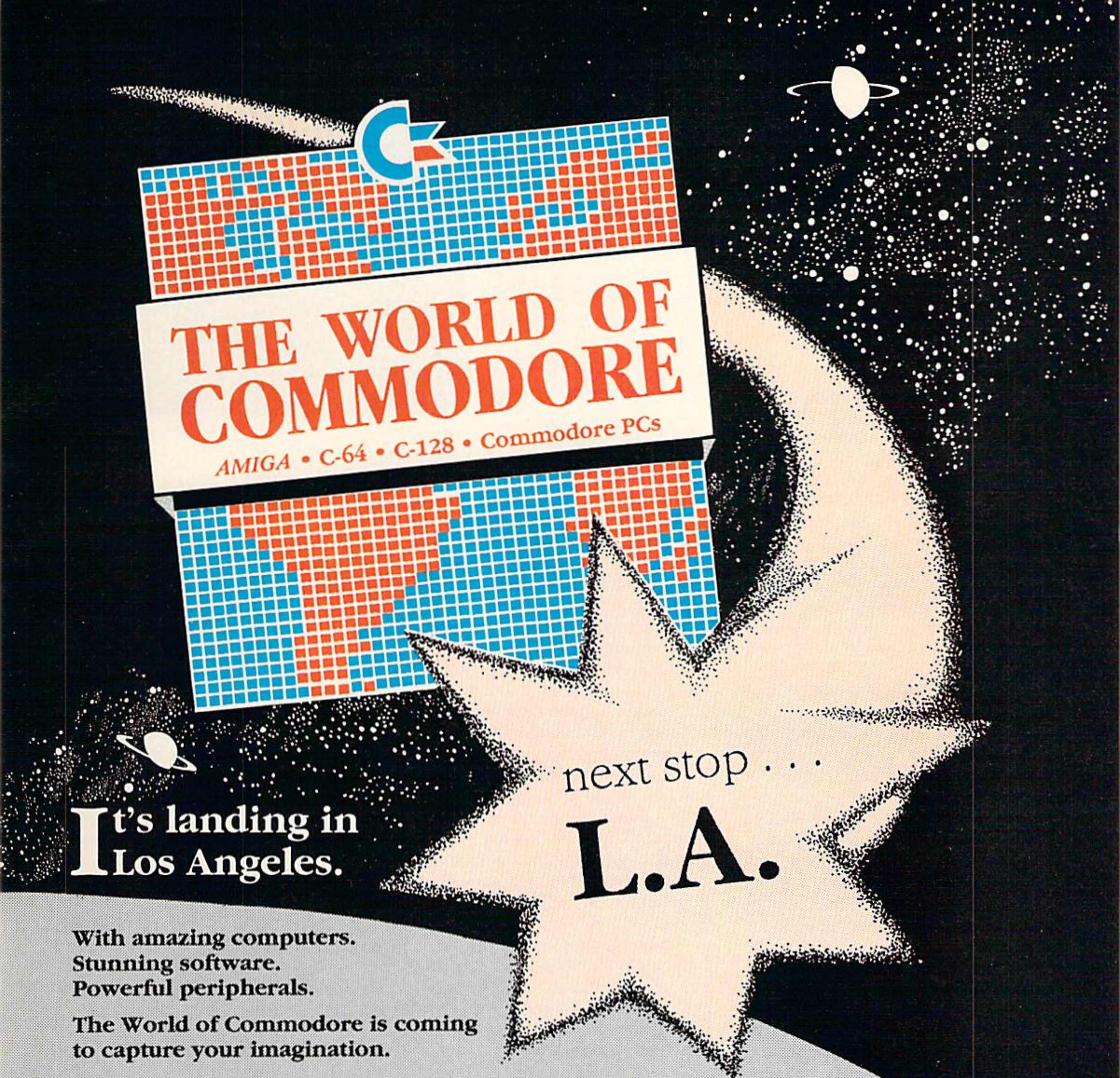
Repeating Keys

With *Super Aide,* you can toggle a special mode that allows all keys to repeat their characters when you hold them down instead of just a few (like the space bar). As you'll see, having every key repeat can sometimes be a necessity, but at other times a nuisance. I did need repeating keys for my program and welcomed this option in *Super Aide.*

Directory Commands

Some wedge commands can be executed on a specific file in the directory by placing the command sequence next to the file name and hitting RETURN after calling up the directory. Such "directory commands" work for things like loading, deleting, searching and saving BASIC programs on disk. Many of the wedge commands work separately and with a directory, so you can easily perform memory organization and other file-related commands by calling up the directory once per set of commands instead of once per command (to see the effect, if any, on the directory). I used these "directory commands" often in accessing the files I had stored on a particular disk.

Continued on page 105



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Reviewed by Russ Ceccola

Kid Niki

Computer: Commodore 64
Publisher: Data East
470 Needles Drive
San Jose, CA 95112
Medium: Disk
Price: $29.95



Kid Niki, subtitled "Radical Ninja," places you as a punk ninja in pursuit of the Stone Wizard, who has stolen your girlfriend.

Just because you buy the home version of an arcade game, don't think that the game is going to become easier to conquer. Even though you no longer have to deposit quarters, it still takes the same amount of skill to finish it. This fact really hits home with *Kid Niki,* a Data East adaptation of one of their best arcade games. You can breeze past certain parts of the arcade adventure game, but others will have you hacking away many times before you get past a certain obstacle or defeat a special foe. In any case, as usual, Data East captured the spirit, game play, challenges and excitement of *Kid Niki* in their adaptation to the Commodore 64.

Kid Niki, which is appropriately subtitled "Radical Ninja," places you as a punk ninja in pursuit of the Stone Wizard, who has stolen your girlfriend, Princess Margo. The atmosphere and punk tendencies of the title character and his girlfriend add interest to a game that has a similar purpose to *Kung-Fu Master* and mechanics like any of the other multi-level arcade games where you battle foes to get to the final enemy.

Kid Niki takes you through seven rounds of sword-spinning action before you meet up with the Stone Wizard. You go through each level fighting creatures indigenous to the geography and the legion of the Stone Wizard. Your only weapons are your jumping abilities and a spinning sword. You use your sword to kill off the living obstacles in your way and your jumping skills to hop past those hills, steps and empty points in space to further your progress. A good combination of both will quickly get you to the Big Bosses who appear at the end of every round.

This idea of the Big Bosses is imported from *Kung-Fu Master* in which you were forced to fight a tougher foe on each level of a five-story house to save your girlfriend. In *Kid Niki,* the same thing happens, but instead of going from floor to floor in a house, you go from land area to land area in the domain of the Stone Wizard. Each round and land has its own peculiarities to consider before tackling the enemies along the way. For example, there are clouds that you must navigate successfully in the Land of the Cliffs before thinking about killing enemy guards. Considerations such as these take *Kid Niki* a step above the standard fare of arcade action games and make it a lot tougher than just shooting or hitting enemies and watching the pretty scenery go by.

The six rounds are each completely different because of the obstacles that are placed before you. What makes them different is not necessarily the characters you confront in each—indeed, there are a few you see in more than one round. Instead, you recognize the landscape as part of a certain round. In Round 1 you go through the Land of the Trees, where you see lots of grass, trees and shrubbery. Round 2 puts you in the Land of the Stone Buddhas, inhabited by birds, bees, monkeys and stone walls. Round 3 takes place in the Land of the Cliffs, where there are a bridge and clouds to jump across and butterflies and boulders to avoid. Round 4 is the cave of the Grody Green Grub, in which bats and fire-spitting frogs are out to get you.

Round 5 starts the beginning of the end in *Kid Niki.* From here on in, the pace builds up as you approach the Stone Wizard. After the Forest of the Mad Monks with its pixie-type characters, chickens and temples, Round 6 boasts a fortress with a guard who is the only thing standing between you and the immediate surroundings of the Stone Wizard. Round 7 requires you to get past an assortment of creatures and characters from every other round before you get to the Wizard. It is easy to get to the Wizard, but tough to kill him. That's it for the rounds. In order to get by them, you need to know how to get by the Big Bosses at the end of each.

The manual describes what you have to do to kill the Big Bosses, but doesn't give any clues as to how to implement the suggestions. Death Breath is the first Big Boss you encounter and the toughest, next to the Stone Wizard. Here you have to master the ability to slip underneath Death Breath when he jumps in the air and immediately stab him in the back. I'll describe the rest in order. To get past Spike, stand in the corner of the screen, wait until he throws his ball and it returns to him, jump over him and stab him. The horned witch requires jumping in the air twice to kill her. Do it quickly or her arrows will end your life.

To get past the Grody Green Grub, watch his patterns of movement and wait for him to pass right by you. Stab his body parts until they turn to skeleton and then his head (three times). Big Baldy is easy to get rid of. Wait until he spits a fireball, jump on the wall in front of him, stab him in the head, jump off and do it twice more. The guard of the fortress is the easiest. Wait until he stabs with his sword and then jump in the air toward his head with your sword spinning. I won't give you any clues on how to kill the Stone Wizard, for I haven't been able to do that trick myself. All I can say is that you can't touch Margo as she moves up and down in front of him, and you have to hope that your sword bounces past Margo so that you can collect it after impact with the Wizard.

That's all you need to know to defeat the enemies in *Kid Niki.* Now let's talk about the actual game play and smooth-

Continued on page 104

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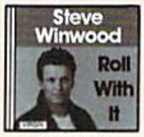
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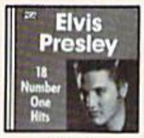
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BMG COMPACT DISC CLUB

Reviewed by Mark Jordan

Arcade Game Construction Kit

Computer: Commodore 64
Publisher: Broderbund Software
17 Paul Drive
San Rafael, CA 94903
Medium: Disk
Price: $29.95



Once you become familiar with the concepts, you will be able to create games in a few hours . . . a few enjoyable hours.

First there was BASIC 2.0. Then there was compiled BASIC. Next came *Garry Kitchen's GameMaker.* The evolution of game-making tools for the Commodore 64 continues with a new offering from Broderbund—*Arcade Game Construction Kit* (*AGCK* for short).

This program, written by commercial game writer Mike Livesay (of *Bruce Lee* and *Miner 2049er* fame), is truly a latest, greatest product. While *Kitchen's GameMaker* was ground-breaking in creating a game-programming language, Livesay's effort moves the process of game-writing out of the programming realm and into a whole new area, that of scriptwriting (kind of). Now, instead of typing commands that the program follows step by step, game creators create actors (five kinds), give them scripts (with cues), and create scenery for the actors to act in (up to 50 scenes per game).

The result is a program that is very intuitive to use. Mike Livesay employed all the latest in user interfaces—windows and menus, pointing and clicking. But the real beauty of this program shows up at a much more basic level, the thinking level. Most of us in the computer biz are used to linear thinking: do this first, then this, check for that, then loop back and do it all again.

Actors and Actions

AGCK has a different approach, a much more "right-brain" method of thinking. Forget about programming sprites. Instead you must design actors. Give them traits (more on that later), cues, and tell them where and when to appear on screen and *AGCK* does the rest. There are five kinds: Player actors (these are all controlled by the joystick), Drone actors (they move in only one direction), Missile actors (bullets, arrows, etc.), Sentry actors (they follow a path you trace), and Computer actors (smart ones who "think" and chase the Player actor). You can have up to 128 different actor animation frames per game.

Suppose you wish to have the gameplayer move a character through a room full of dangerous foes. You would have to design a Player actor using the built-in editor. Each Player actor you design has several "poses" you would need to design: a standing still pose, moving left, moving right, moving up, moving down, jumping, falling and dying. Each one of these poses could have up to eight animated frames. For example, when the joystick is doing nothing, you could have your Player actor sit there chomping, scratching, whatever. When the joystick is pushed to the right, your Player actor will begin the moving-right animation. You need know nothing about sprite pointers, data or even checking the joystick. You simply design the actors.

Anyone who has ever tried to do collisions with sprites in BASIC will really appreciate the way *AGCK* handles all that. The program simply has you give each actor a series of traits that kick in when collisions occur. One of these traits is that the colliding actor will kill *all* actors it touches. Another is that the actor will only kill *Player* actors. And still another is that the actor will kill all others, but he himself will be invincible, even if touched by another "kill all" actor.

When collisions occur these traits determine the outcome. This method of game development liberates the creator from step-by-step instructions. But I repeat: this is not simply a system that makes programming easier; it's a non-programming method of creation. To create such a system, Mr. Livesay had to identify and analyze the whole computer gaming concept. This he did, and the result is stunning. Below are some more samples of this program's finesse.

Gravity and Inertia

Inherent within climbing games is the concept of gravity. You may never have thought about it, but without gravity a climbing game wouldn't be much of a challenge. *AGCK* includes a gravity option. If turned on, all actors will be influenced by it.

AGCK allows you three options for overcoming gravity if gravity is selected in your game. One, you can set the joystick so that pressing the button causes the Player actor to jump. You can also select the height and forcefulness of his leap by moving a slider. As mentioned above, animating the jump is quite easy.

A second way *AGCK* allows actors to overcome gravity is by climbing, namely ladder climbing. This is accomplished when you design your background—"scenery" in the *AGCK* parlance. An important point to note here is that *AGCK* does not use a bit-mapped screen. It uses a character-mapped screen consisting of 24 rows by 40 columns (the top of all screens is reserved for score keeping). You must design the characters (called scenery blocks) using a built-in character editor.

Up to 128 scenery blocks are available. Each of these has traits just like the actors. To create a ladder, simply design a scenery block and select the ladder trait. Your ladder extends as far as you wish: just be sure that each scenery block in the ladder has the ladder trait. That's it. Now, when an actor comes in contact with that scenery block, he can start climbing and overcoming gravity.

Conveyors are the third gravity-beater. They are done in the same way as ladders.

The difference in function is that once a character touches one, he gets a free ride to the last in the series.

Gravity can also be used to create "wind"—just set the gravity direction for right or left.

Related to gravity is inertia. In case you've forgotten your physics, inertia means that a body in motion tends to stay in motion. If you turn on inertia, you'll make it hard for a player to stop when he's running. You'll also force actors to take running starts if they want to jump both up and over.

Friction, Elasticity and Other Traits

Other traits scenery blocks can have include friction and elasticity. Make a block frictionless, and actors going across it will have trouble getting traction. Surface elasticity sets the "rubberiness" of a scenery block. If you set this high, any actor that comes into contact with this block of background data will bounce off like professional wrestlers off the ropes. Set it low and actors crash into it.

Or how about this: teleportation. If you select it for two different far-apart scenery blocks, whenever an actor touches one of the two, he is teleported to the other.

All of these traits are implemented with the mere click of a switch. The process of setting up scenes, designing the goal of each one, placing actors in each, and then testing them out is easy and fun.

If it sounds like I'm impressed, them I'm getting my point across. The entire package is thoughtfully designed, feature-packed and powerful. It even comes with seven games, all by expert designers. You will be able to borrow "parts" (actors, scenery, etc.) from these games making game-building an even easier proposition. Once you become familiar with the concepts, you will be able to create games in a few hours . . . a few enjoyable hours.

The package allows you to make gift disks for friends even if they *don't* have *AGCK*. There are some limitations involved such as only one game per disk and only 15 levels of play allowed.

Is this the Evolutionary Climax?

There are a few weaknesses in the product. For one, a mouse driver is not an option. Since I have a 1351 mouse and since this program is especially appropriate for mouse input (not only for pointing and clicking but also for drawing), I used my 1351 in joystick mode. It isn't quite as nice as using the true proportional features, but it sure beats a joystick. (To put the 1351 in joystick mode, hold down the right button while plugging it in.)

Another drawback is that you cannot use *AGCK* with a two-drive setup. A lot of disk swapping is required which could have been avoided.

Here's another: the program has that made-for-Apple II feel to it. That wouldn't have bothered me, but I feel the program suffers somewhat for it. A collision is recorded based on character blocks rather than actual lit pixels. Two ships that pass in the night (but don't touch) might blow up due to this. Also, every aspect of the game is in multicolor mode which means lower sprite resolutions. I strongly prefer the higher-res sprites. All faithful Commodorians know that a sprite is 21, not 16, pixels in length. This "shortness" betrays Apple-itis.

Also, some types of arcade games won't be as easy to design using *AGCK* as others. I do suspect that as *AGCK* becomes popular, tips and tricks will start to pour forth from the user community. ***[Editor's Note:** If you have any such tips, see Lou Sander's Gold Mine on page 16 for infor-*

Continued on page 105

Reviewed by John Ryan

Reach for the Stars (3rd Edition)

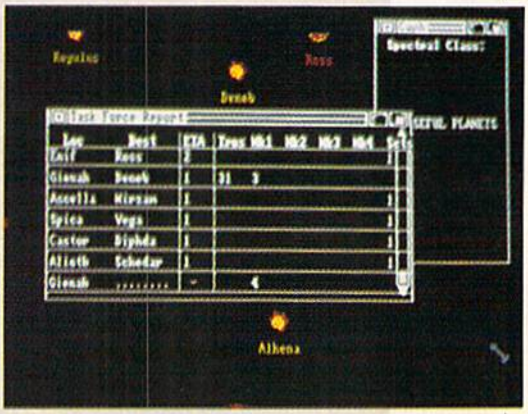
Computer: Amiga
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Price: $39.95

It's amazing how a superb game can turn even the most prolific review writer into a master of procrastination. It's my own fault, I guess, but I find myself not wanting to write this review of Strategic Studies Group's (SSG) *Reach for the Stars (3rd Edition)*. Not, mind you, because of any inherent laziness on my part, or for the effort I expend guarding against the rogue passive voice or scurrilous dangling participle; and certainly not because of any particular weakness in the game itself. Writing this review means one thing: I am not playing *Reach for the Stars,* I am merely writing about it. With a game this good, that is indeed a distraction.

The scenario surrounding this contest of space conquest and colonization is disturbingly familiar; certainly the concept is not new. For as far back as I care to remember, variations of galactic Risk-type games have flourished. Moreover, *Reach for the Stars* has been available in one microcomputer format or another for some five years now. So what's the big deal? Why write about an old game with a new face? First and foremost, I am not talking about just any new face, I am talking Amiga, with everything that particular face has to offer.

Secondly, with comparison to similar games in mind, *Reach for the Stars* is the granddaddy of them all. You'll not find a like program with as much playability, versatility or depth as this one, nor will you discover a universe so richly detailed and filled with as many sublime complexities. You are Julius Caesar, Napoleon and MacArthur all rolled into one, and the territory you must master (and perhaps conquer) is as vast as it is unyielding. But don't get the idea that the crux of *Reach for the Stars* revolves around you being some kind of a maniacal tyrant. Far from it—although a bit of ruthlessness, however distasteful that may sound, is certainly called for. Only the strong will survive, and the road to strength can be paved by your tactical genius.





If the enemy catches you off guard, or investing in factories instead of warships, expect to lose everything except the laces in your space boots.

But let's start at the beginning, where you and three other human or computer-controlled opponents are dumped on a planet with average natural and industrial resources. You must then build that planet into an industrial and military powerhouse before you can spread your wings to the surrounding star systems. The name of the game here is resource points. These points are accumulated by nourishing your planet's population, industry and environment. You can then use the resource points to reinvest in industry, build up planet defenses, construct warships and scouts, build transports to colonize other planets, or invest in research and development to increase your technological base. You can never have enough resource points, and it seems you never do.

The trouble here stems from the fact that you don't really know what the computer opponents are up to. They are a sneaky bunch and you won't know (until late in the game) what planets they own, who they are plotting against or whether or not an alien task force is lurking just beyond the next planet, ready for the kill. Computer opponents being what they are, you can bet they are not sitting around drinking mint juleps and watching the stars twinkle. They are all vying to take away your hard-won real estate. If the enemy catches you off guard or investing in factories instead of warships, expect to lose everything except the laces in your space boots.

The game is divided into turns. A turn consists of two movement phases and a production phase. Selecting options during these phases is accomplished in typical Amiga fashion: Click on the menu bar, then pull down a menu to browse through the commands. Options in each window are limited, depending on what phase the game is in. You must click on a planet to bring up an information window. This window contains vital information pertaining to the health of the planet's economic and military base. Additionally, a window will appear detailing any task forces orbiting the planet. While all windows presented may be dragged and toggled with front and back gadgets, they cannot be resized (which can be irritating on a cluttered screen). Though the game can be played entirely via mouse and numeric keypad, almost all of the mouse command options have a keyboard equivalent.

During the production phase, there is a wide range of planetary investments to choose from, and your investment decisions can become clouded by how you perceive the current threat level. In other words, during peaceful periods, I was tempted to stash all my planet's resource points in industry and technology, while during periods of crisis (read: getting the stuffing knocked out of me), I found myself frantically building warships and planetary defenses to protect my precious territory. The program will display how

many resource points you may allocate to each of your planet's resources in the production window. Resource points not spent during a production round will be transferred to a global pool that can be withdrawn during later production phases by any of your planets. This global pool represents interstellar trade.

Planets can be garnered in two ways: colonization or conquest. Each method has its own peculiar problems. Colonization is the easiest, though not always the most economical way to gain new territory. This requires that transports be built and loaded with a percentage of your parent planet's population (a drain which can affect a planet's short-term production of resource points). Additionally, a newly colonized world is often wild and uncivilized, and many of your colonists will soon die if the new planet's environment and industry are not rapidly developed. Since a planet's population is the key variable for producing resource points, you must keep a steady convoy of new transports to replace population losses on the new planet—at least until the environment is developed sufficiently to support the colony. This can take several turns and burn up many resource points. Moreover, a new colony must be protected, so you may want to send escort warships along with your transports, and this can spread defense forces mighty thin after having colonized several planets.

War, on the other hand, has its merits and, depending on how technologically advanced your enemy is, can be cheaply waged. The advantages of interstellar conquest are twofold, for by the time you have progressed far enough to build a reasonably-sized attack force, your opponent's planets will have become fairly industrialized and will require little investment on your part—assuming, of course, you can overcome the planet without bombing it into submission, which tends to destroy industries and population. Secondly, once a planet has been invaded, you may then use its resource points during subsequent production phases to build new warships or rebuild the planet's own defenses. (The computer is a sore loser; you can bet that retribution will be swift and ruthless!)

The disadvantages, however, must be weighed carefully as you slaver over likely targets. Conquered worlds can be hard to hold on to, especially if your opponent has several other worlds from which to draw resources. This means you can expect several rescue attempts in the form of enemy task forces at your doorstep. Also keep in mind that a conquered race is all too eager to throw off the yokes of tyranny. Be quite certain that you can garrison enough troops to hold on to a conquered planet, or you may find yourself facing a formidable rebel force. After several turns, these rebels can retake the planet and force you to bring in reinforcements. If reinforcement takes more than a few turns, expect to face newly-built planetary defenses and, perhaps, an angry enemy task force, to boot.

Warships are built during the production phase, then formed into task forces and given movement orders during subsequent movement phases. How effective a warship is depends on its technology level. The Mark IV is the most powerful warship, but it requires thousands of resource points in technology investment. Until technical advances can be made, you'll have to settle on building outdated Mark I vessels—which are okay in the early going, but become little more than laser fodder at later stages of the game. Likewise, in advanced scenarios, navigation and industrial technology come into play, and you will only be able to explore tiny sections of the galaxy until these technol-

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Reviewed by Gary V. Fields

Birds 'N Bees

Computer: Amiga
Company: Intracorp, Inc.
14160 S.W. 139th Court
Miami, FL 33186
Ages: 8 years and older
Price: $14.95

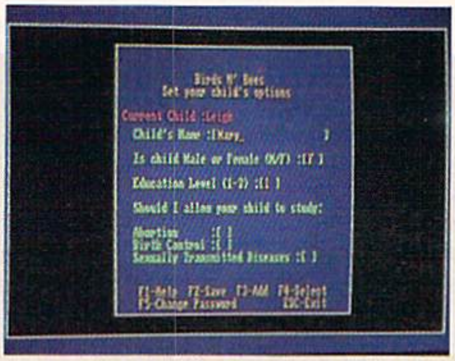
When sex is mentioned, most people listen—including children. Unfortunately, the sex lessons children learn on the streets can be confusing, misleading or downright dangerous. *Birds 'N Bees* is a no-nonsense, sex tutorial, designed to help adolescents get the information they need, when they need it, without embarrassment. The program uses a sexual information database (divided into three informative levels, subdivided into male and female categories) to strip the myth and mystery from human sexuality.

The program is actually a massive source of sexual data which the child can selectively retrieve and read. The information is divided into two categories (male and female), each of which is subdivided into three levels according to age. The levels and categories a child can access can be restricted by the parent or teacher. This sensible approach allows children to retrieve information written in a manner they can understand and which is suitable to their stage of development. Thus, as the child matures and requires more information, the parent can change or increase the access levels.

As the parent of a boy and a girl with a four-year age difference, I was happy to see that this password security scheme let me set up a different *Birds 'N Bees* program disk for each. Because the disk is not copy protected, it is easy to set up a specific program disk for each child—according to age and gender.

The program is void of sound effects and graphics and does not use the mouse at all, which at first might seem strange on the Amiga. But use of the key controls and the businesslike presentation of information works perfectly. I think the inclusion of sound would have been distracting, and the use of graphics could have attracted the wrong kind of interest in the program. What is left is a straightforward presentation of sex-related information.

Beyond simply teaching about the human reproductive functions, the program helps explain how a person's body changes



Birds 'N Bees doesn't replace parental information, it augments it.



as he or she matures, separates sexual myths from facts and gives tips on how to stay safe with strangers.

To get to the information, the child simply highlights the subject. At any time the child can escape an option by pressing the ESC key or summon help by pressing the F1 key. The main menu lists five options: Instructions, Lessons, Questions and Answers, Dictionary and Parental Options. The first option simply tells the child how to activate program options, and the Parental Options (a password is required) allow the parent/teacher to free or restrict information available to each child. Lessons opens a new window which lists subjects the child can learn about.

The information available here is determined by the sex of the child and the level assigned by the parent/teacher. For instance, a female with level three access would be presented with these subjects: Development, Personal Safety, Abortion, Birth Control and Sexually-Transmitted Diseases. But a girl with access level one could be restricted to lessons about Development, Personal Safety and Reproduction. When a subject is selected, a new window displaying the information opens. When the lesson is finished the child is tested (on screen) about the information presented. After the test is finished, the lesson information will appear again, and any information missed during the testing session will be shown in reverse type.

The Questions and Answers section presents those sexually-related questions most often asked by children at a particular level (one, two or three). Once activated, the child can scroll through all of the questions and have the program answer (by pressing "A") those they wish. I was glad to see this option included; it gives children an easy, embarrassment-free confidant they can turn to with questions they may be hesitant to ask an adult and too often get answers based on fiction instead of fact when they ask their friends.

At level three, the female questions cover things like orgasms, masturbation, intercourse and the hymen. On the other hand, a level-one female is restricted to questions like "Why do pregnant women look fat?" and "How does the baby know when to come out?"

The dictionary, is just that—an electronic dictionary of sexually-related words and definitions. To use it the child simply scrolls from top to bottom or searches for a particular word by using the "find" option. Again the words the child will find are restricted by the level and sex selected by a parent or teacher. For instance the dictionary for a girl on level three begins with the word *abortion*, but the dictionary for a boy on level one beings with *abdomen* instead.

If the child wants to look up a word, he or she simply enters the word and presses RETURN. If the child is not sure of the

word, he or she can search for it by using a few letters. For instance, to find the definition of *female* the child could simply enter *fem,* and the dictionary would locate the information.

The levels and categories a child can access can be restricted by the parent or teacher.

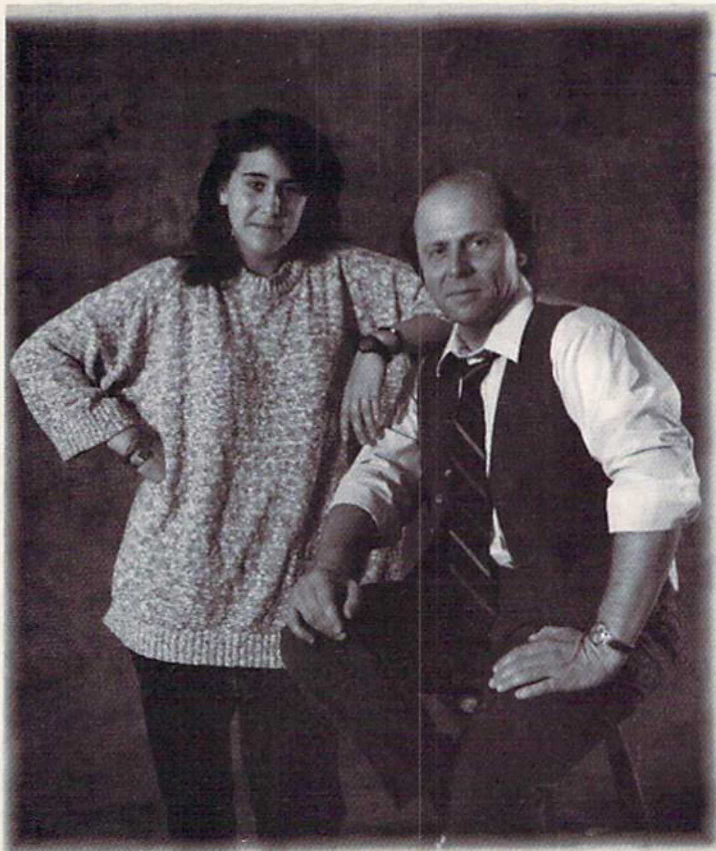
As a teaching aid for children, I found *Birds 'N Bees* excellent. Its sensible interface makes it simple for children to use, and its unbiased information base offers straight, untainted facts. I've always believed children should get their sex education from their parents. My wife and I have tried to follow the rule of thumb to give our children all the information they wanted or needed for their age, but not to confuse them with words, ideas or facts inappropriate for their ages (e.g., four-year-olds may be curious about the names of body parts but not their functions). We've encouraged both our children to ask us about anything, and we've promised to answer them honestly and without emotions.

That seemed to work as long as we were our children's main source of information. But our daughter is now entering her teen years, and I suspect much of her sexual information—some accurate, some not—is coming from the girls' locker room. That seems to be a normal situation. Not wanting her to be confused by some of the misinformation she is probably collecting from her friends (I remember my teenage years), I gave her a copy of *Birds 'N Bees* and free time with the Amiga. The program is not her sole source of sexual information, but it is a good reference she can turn to without being embarrassed or misled. *Birds 'N Bees* doesn't replace parental information, it augments it.

Because the program is not copy protected (it can easily be installed on a hard drive) and the information on the database is in plain ASCII format, you should be able to expand, delete or add to the information you want your children to learn. The program does not have an option to do this, but using ED, or a word processor which can save files without format code, you should be able to add any missing or new slang words or information you think important for your child to be aware of. Using the same action, if you wish, you could tailor the information files to reflect your personal or religious teachings. While I found nothing in the information files distasteful or troublesome, I am sure there are users who may object to some of the instructions in areas like masturbation or abortion. While I don't recommend changing the text—I found all the information clear, complete and tasteful—because of the way the files are stored on disk, it is possible to change them if you wish.

Regardless of how sexually liberated we think we have become, there are still some subjects most of us feel a little uncomfortable discussing. I admit there are aspects of the subject of human sexuality which I feel uncomfortable discussing with my children. Apparently that feeling is shared, because when those subjects are discussed my kids usually listen, respond when appropriate and then excuse themselves as soon as an opening is presented. This is why I think *Birds 'N Bees,* is so valuable—it is not as a substitute for parental instructions but an excellent parent's aide. My children will ask the program about subjects they are hesitant to mention to me and (I hope) return to me or my wife for added instructions or further clarification.

Continued on page 110

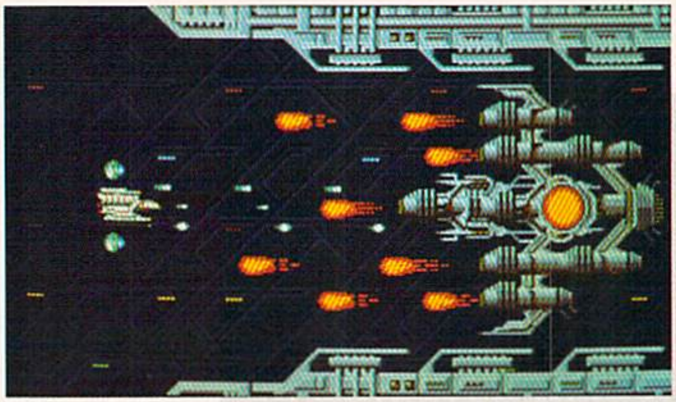



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Reviewed by Graham Kinsey

Menace



Computer: Amiga*
Publisher: Psygnosis
Distributor: Computer Software Services
2150 Executive Dr.
Addison, IL 60101
Price: $29.95

The object in *Menace,* the new Amiga release from Psygnosis is to destroy all the alien forces on the planet Draconia. Draconia consists of six different zones, each of which is controlled by a separate ruler. With a single fighter you must destroy the forces in each of these six zones one at a time. Your fighter's only weapon is a low-powered beam, but this beam has a special function.

In addition to being able to destroy aliens, this beam can transform the debris into useful energy. It can create force fields and laser beams and can actually create and arm new weapon structures. The beam must be fired many times upon debris to change it into a useable form. If the beam is fired ten successive times (there is a consolation prize of 1000 points if the beam is fired at least five times), it will attach a pair of short-range, rapid-fire cannons to your ship. These primary weapons are necessary to destroy large groups of aliens.

Fire the beam 15 successive times, and a high-powered long-range laser canon is attached to your ship. The laser is the only long-range weapon you can have in *Menace,* and among other things it is crucial in defeating the guardians (more on them later).

If fired 20 successive times, the beam can increase the speed of your ship's engines (this is referred to in the game as a "Speedup"). Your speed can be increased seven times during the game, making it much easier to pick and choose which aliens you will destroy first, as well as being able to evade them if necessary.

If the beam is fired 25 times in succession, it can attach an Outrider to your ship. Outriders are weak cannons that have a short range and don't fire very rapidly. However, Outriders never run out of ammunition, and they are the only weapons that do not have a fixed firing angle. And Outriders are the only weapons that allow you to attack aliens from the side or from behind. At most you can have two Outriders attached to your ship.

If the beam is fired 30 successive times, it generates a force field around your ship. Although this force field is very temporary, your ship is impregnable to all attacks while it is in effect.

Finally, if the beam is fired 35 successive times, the most valuable attribute is gained. The beam will fully recharge your shields for you. At the beginning of the game your shields start out at maximum capacity; this is the only way to replenish them. Since in *Menace* you get only *one* chance, you must attempt to keep your shields intact at all times. If your shields are ever totally drained, the next successful alien attack will destroy you and the game will end.

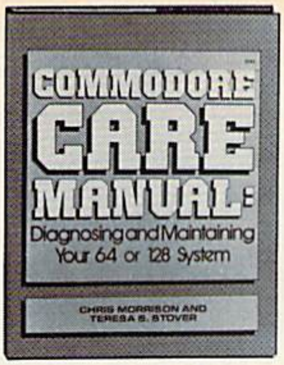
Enough on the ship, what about the aliens? As mentioned before, there are six different zones in the planet Draconia. In each zone you will face many groups of aliens. Although you don't have to destroy every single alien in each group to advance to the next wave, you must destroy all of them in order to give your beam a chance to turn the debris into useful items. Not only does an alien's touch drain your shields of energy, but some can also fire their own missiles at you, which must be destroyed by your weapons. If you select the expert option, you must also worry about not flying your ship into various structures that line the playing field, since in the expert mode contact with these structures also weakens your shields.

If you successfully advance through all the waves, you must face the guardian, the ruler of the zone that you currently are in. Guardians are simply whirlwinds of destruction, and (unless you have a force field around your ship) you will find it very difficult to destroy these beasts without using up most of your resources. Guardians' bodies are vulnerable at only one point, which is denoted by a swirling mass of energy. Only by defeating the guardian can you move to the next zone. To win the game you must defeat all six guardians, advancing through the waves of aliens that precede the guardians in the process.

Menace's main selling point isn't the story line nor the mechanics behind the game. What is most interesting about *Menace* is that it uses the Amiga's Extra HalfBrite (HalfBrite for short) graphics mode to display up to 64 colors on the screen at once. This is the first game I've ever seen that uses HalfBrite mode. (Some Amiga 1000 owners don't have this mode, but these owners now make up less than ten percent of the Amiga's installed base.) In addition to HalfBrite, *Menace* also uses overscan to display a slightly larger area of graphics than would usually be displayed. Although there's nothing unique about the music and sound effects, they are certainly up to standard for Amiga arcade games.

I could find no bugs in *Menace.* It never crashed on me, and unlike Psygnosis' earlier arcade games, *Menace* will run on an Amiga with a 68010/68020/68030 installed. I do have some complaints about the game mechanics (for example, the icons for the Speedup and Outrider attributes still appear even after you have already attached both Outriders or have sped up your ship seven times). But more importantly, *Menace* is a game that requires excessive pressing of the joystick button. If you don't have a rapid-fire joystick, you can advance in *Menace* only as long as your thumb doesn't cramp up on you. But if you can accept this fact, then *Menace* is a title that is more than worthy of consideration when you are itching to buy a new Amiga arcade game. ■

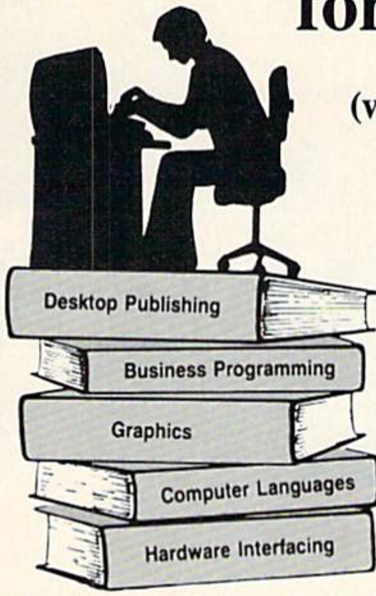
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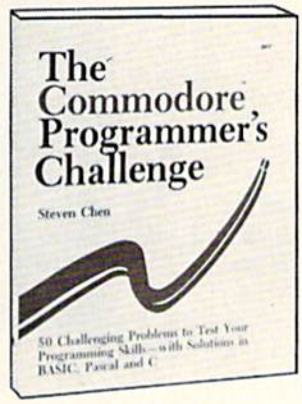
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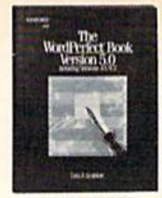
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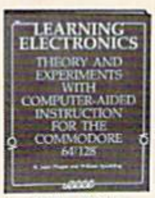


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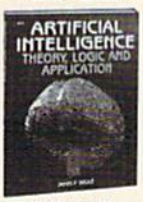


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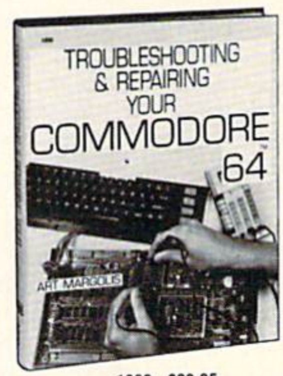
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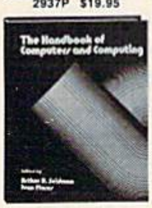


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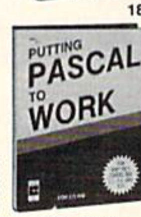
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Reviewed by Mike Rivers

Offshore Warrior

Computer: Amiga
Publisher: Titus Software
20432 Corisco Street
Chatsworth, CA 91311
Price: $39.95



The stern of the boat is depicted complete with an animated wake and exhaust ports.

Offshore Warrior from Titus is an arcade-style shoot-'em-up with a difference. Here, you are racing speedboats equipped with missiles, on a course that has danger at every turn—a fairly interesting idea for an arcade game. Actually, it's the only racing game I've seen that is based on speedboats.

The game cycle is grouped into four races which constitute an "annual" offshore championship beginning in the year 2049. Not only do you get a high score, but a date is shown for your final race, emphasizing the aspect of survival. The title music is an extremely funky sampled piece which will make you stop and listen before proceeding with the game. Disk access is accompanied by a "rolling bars" animation which has a distinctive "euro-graphics" look.

Offshore Warrior attracted a lot of attention at shows this past fall, and justifiably so; the graphics are admirable. The architecture of the buildings in the screen backgrounds is nicely done. As the play cycle progresses, futuristic building complexes and landscapes scroll by in the background. They don't have much bearing on the game's playability, but they're rather eye-catching.

In *Offshore Warrior* the player controls a high-powered "cigarette boat"-like craft around courses placed on some of the world's famous waterways. Your boat is steered around a course of rocks and buoys while you try to pass or blow up your opponents with rockets. Each race is preceded by an illustration depicting the area you'll be racing in and a title plaque showing the name of the course, the number of contestants and a "clock" of sorts (no relation to the system clock or battery back-up clock).

Press the fire button and the race begins. Your boat is in the foreground with the competitors racing past. The stern of the boat is depicted complete with an animated wake and exhaust ports. As you get up to speed, you can see the bow lift as the hull reaches planing velocity. At that point, the boat becomes easier to steer, and you can catch up with the rest of the field. The boats behave somewhat realistically; they must be going a certain velocity to be steered properly, they jump over the "ripples" that appear periodically and lose velocity when they do. The race progresses through wide, sweeping turns as the background scrolls according to your movement through the course. Lake Michigan features large blue and grey pyramidal structures (I didn't know Michigan has volcanoes). Lake Victoria has somewhat Dali-esque globes with large glass domes that give the appearance of eyes watching the race (and more volcanoes). The Finland Gulf seems to have a reproduction of Los Angeles on its shores (and you guessed it, more volcanoes), and Lake Baikal shows a large grandstand surrounding the lake with a dark mountain looming on the horizon.

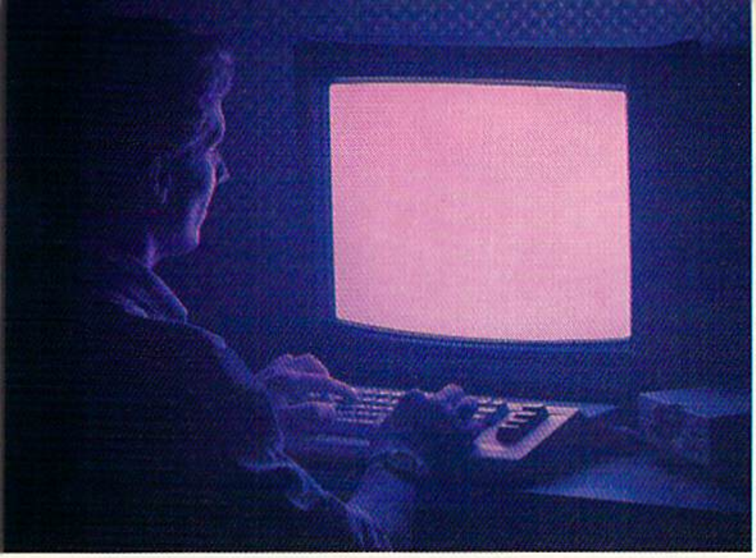
When the game begins, you must immediately accelerate to top speed because your opponents invariably go right past you (all the better to blast them!). As you overtake the competition you can either blow them out of the water or maneuver to pass them. At lower levels, it's easy to pass boats, though the simplest way to deal with them is to use your rockets. During the race you have a limited number of missiles you can fire at the other boats to eliminate them. You can't shoot them all because you don't have enough rockets. This adds a dimension of strategy; you can try to blow the other boats out of the water at the starting line or wait for a more opportune time. Rockets are fired from either side of the bow, so you must position your shots carefully.

As you get closer to the marker buoys, rocks appear on the side you are closer to. Watch out! You don't have to get very close to them to run aground. Rocks are particularly troublesome if you are trying to accelerate from a dead stop in the middle of a curve. According to the instructions, you can push opponents into the rocks, but I didn't have much luck doing that. In fact, the player's boat seems predisposed to blow up when attempting maneuvers suggested in the manual.

You get bonus points for eliminating opponents or finishing first or second, and more missiles when you reach higher levels (at higher levels there are more competitors, so you still don't have enough missiles to get everybody).

There were only a few complaints from folks with whom I played *Offshore Warrior*. Some couldn't figure out which side the missiles were coming from next. The brakes didn't seem to do much good even when slowing down for waves. Nobody could figure out the purpose of the clock

Continued on page 80



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Reviewed by Steve King

Battleship

Computer: Amiga
Publisher: Epyx, Inc.
600 Galveston Drive
Redwood City, CA 94063
Price: $29.95



While the beauty of the game is that you don't need a live opponent, there is both a two-player and multi-player tournament option.

I still vividly remember playing Battleship when I was a kid. Back then, you and your opponent each drew a grid on a piece of paper and filled in various squares to represent several ships. (We were too poor to afford the Milton Bradley version.) A submarine filled up two squares, a destroyer three and the battleship four. In turn, you "shot" at each other's ships by calling out coordinates, and the first one to sink the other's ships won the game. More recently, an electronic board game version of Battleship was marketed, and now Epyx has released it for the computer.

The game itself is amazingly simple and based primarily on luck. It is, however, quite addicting. You start out with a 20 × 20 grid, flanked on the right by detailed pictures of six ships, ranging from the lowly torpedo boat to the mighty battleship. You place them on the grid by pointing at them with the mouse and dragging the configuration to the desired location on the grid map. The ships are then represented by a series of adjacent shaded squares of different configurations. While the torpedo boat is two squares long, the battleship is six (two offset rows of three). By pressing the right mouse button, you can rotate the ships to place them in horizontal, vertical or diagonal positions. After you have finished, the computer randomly determines who gets to shoot first. I discovered, however, that the computer opponent seems to get the first round most of the time, but what can you expect—it's his game!

To fire, just position the mouse pointer over the squares on the grid and press the left button. You get four shots for each of your ships that is still afloat, so each side starts out with 24 salvos. When you are finished, the program switches to a screen depicting a view from your ship's bridge. Two guns in the foreground lob shells at the enemy fleet sailing in the background. As the guns roar and the shells whistle across the sea, enemy airplanes swoop overhead. If you are lucky enough to score a hit, the damaged enemy ship begins to list, break up and eventually sink when you have successfully hit all of the squares the ship occupied. After the bombardment phase, the program switches to the grid screen indicating both your hits and misses. To the right you can see a graphic representation of the ships in various states of destruction. When a ship is sunk, it is replaced with a life preserver, and the side that lost the ship loses four shots. The game goes on, alternating sides, until one side wins at which point his fleet victoriously sails across the screen.

Battleship is a short, simple game, usually taking from six to ten minutes to play. The only real strategy is determining how to place your salvos once you have scored a hit on a ship, as each ship has a different shape. I found, however, that the computer cheats a bit. By the placement of its salvos around a ship with a single hit (when more than one ship is hit on a turn), it always seems to "know" the correct configuration to aim at. The graphics—what there are of them—are nicely done. And an English-accented digitized voice always announces how may shots you have to fire before your turn. While the beauty of the game is that you don't need a live opponent, there is both a two-player and multi-player tournament option. Unfortunately, there is no surrender option, so even if you know you can't possibly win early on in the game, you still have to continue playing to the bitter end before you can start a new game. To make the game more realistic, Epyx should have assigned more shots to the larger ships rather than an equal number to all.

But despite its simplicity, it is an amusing, time-killing little game, and I found myself playing it over and over again. And the game definitely creates tension and anticipation as you watch the shells being lobbed at the ships, hoping for hits and misses (depending upon who is the "lobbor" and the "lobbee"). For those into complex naval strategy games, *Battleship* won't fill the bill. But if you enjoy the Battleship game of your childhood and can't find anyone to play it with you, the Amiga is always ready, willing and able, sir. ■

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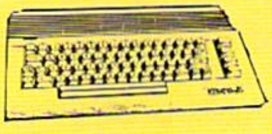
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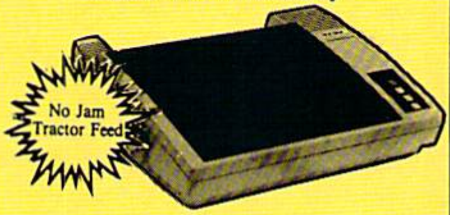
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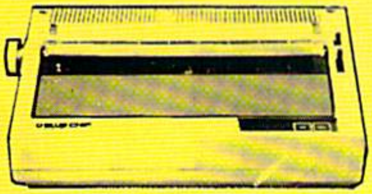
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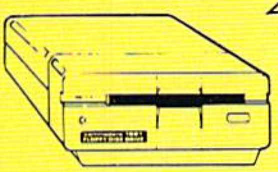
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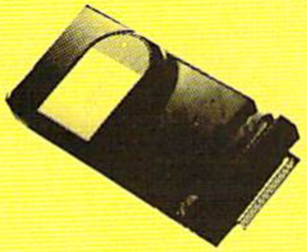
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Reviewed by Steve King

FrameGrabber



Computer: Amiga
Manufacturer: Progressive Peripherals & Software
464 Kalamath Street
Denver, CO 80204
Price: $699.95

One of the advantages of the Amiga's capability to display graphics in 4096 colors is the ability to display high-quality pictures and artwork. There are a number of different ways to get those graphics into the computer. The traditional, least costly method has always been hand drawing the image with a mouse using any of the numerous paint programs available. While very cost effective, the graphics are only as good as the artist who draws them—and, let's face it, most of us aren't artists. Enter the video digitizer, an electronic peripheral that takes a video image from a camera or VCR and converts it into a format that can be stored, manipulated and displayed by the Amiga.

The earliest Amiga version of the digitizer worked with a high-resolution black and white camera equipped with red, blue and green filters. The digitizer program captured a separate image through each of the three filters and then synthesized them into a full-color picture. While this method produces the best results, its limitations are obvious. First, only still images that could be photographed by a camera could be digitized. Second, it took a while to complete the digitizing process.

The more advanced digitizers are capable of capturing a clear, static image from videotape or a video tuner as well. FrameGrabber from Progressive Peripherals falls into this category and produces excellent digitized images from moving videotape. The hardware portion of FrameGrabber consists of a metal box with its own external power supply. You connect your NTSC video source through a jack on the front panel and the Amiga through a Centronics parallel printer cable (not included with FrameGrabber). Additionally, you have route the video output signal from the Amiga to your monitor through the hardware. This configuration renders your monitor incapable of operating when FrameGrabber is not turned on, unless you re-route your video output signal directly to your monitor when you are not using FrameGrabber.

	B&W	16 color	32 color	HAM
320 × 200	3	—	12	25
384 × 240	4	—	15	32
320 × 400	5	—	39	44
640 × 400	17	41	—	—

Table 1

The software supplied with the hardware makes digitizing a breeze. The first thing you do when the program starts is to select the display format of your image. This ranges from 320 × 200 to 640 × 400 as well as an overscan variant of the low-resolution mode. Next you select the color mode which includes black and white, two-color half-tones as well as a dithered HAM mode. If you wish, you can set the program so it will always begin in a predetermined display and color format. Now, by pressing the TAB key, you can toggle between the program screen and the actual, real-time digitized image being generated by the hardware! All of the menu items can be accessed by pressing keys as well as by mouse clicks.

If the quality of the image is not to your liking, several adjustments can easily be made simply by turning three knobs on the front panel. The first, Brightness, lightens or darkens the picture. The second, Saturation, controls the intensity of the color; and the third, Hue, controls the color tone. These three adjustments are, in fact, identical to those found on ordinary color television sets. This feature is invaluable, as you can see what the final digitized image will look like without the time-consuming trial and error process of re-digitizing a picture until you get it right.

To capture and digitize an image on the screen, simply press the letter "C" on the keyboard. Table 1 the approximate times (in seconds) I found it takes to capture and display an image in the various modes and formats.

Most of the time is spent processing, analyzing and displaying the image, as the actual capture takes no more than $\frac{1}{30}$ second, and the transfer from the hardware to the Amiga takes about three seconds. The fast capturing speed combined with the internal RAM in the FrameGrabber hardware makes digitizing moving images possible. By the way, the software also provides the ability to digitize an image using a monochrome camera with color filter wheels.

Once the image is displayed, you still have the opportunity to fine tune the picture if you are dissatisfied with the colors. There are controls to adjust each individual color as well as all of the colors simultaneously. There are also controls to modify the way the program actually determines the best color palette by permitting you to adjust both the RGB ratios and the color contrast threshold.

If you are satisfied with the image, it can be saved in any of four different formats. The most common is the IFF ILBM format which is compatible with all of the graphics programs available for the Amiga. The Raw Data format saves all of the color data generated by FrameGrabber but produces a file that takes up almost an entire diskette. This format is useful for programmers who want to capture an image and then do their own processing. The IM8G file format produces the smallest file but can only be used by specific programs that recognize this type of file format. Finally, the IP File stores the image in a Digi-View-compatible for-

Continued on page 104

Reviewed by Russ Ceccola

Quest for Clues

Editor: Shay Addams
Publisher: ORIGIN
136 Harvey Road, Building B
Londonderry, NH 03053
Price: $24.99



Anyone out there who has ever gotten stumped on an adventure game, raise your hand. Okay! Now all those who have played adventure games and didn't raise their hands will be shot at dawn, 'cause you're lying. No one has ever gotten through an adventure game without getting stuck, even if only for a minute. No one is immune to getting frustrated with a computer adventure and wanting to put it away and come back later. Everyone who has ever played an adventure game knows what it's like to beg people to help them with the game, look anxiously in book stores and software stores for solutions to your favorite adventures, stay up late at night trying to figure out a game by trying absolutely every possible combination of verbs and objects (including the nonsensical and obscene) in an attempt to stumble blindly upon the answer to your dilemma.

But now you can overcome your adventure frustrations, at least for some of the more popular adventure releases. With the publication of *Quest for Clues* by ORIGIN, you will find the answers to many of the problems that plague you in the 50 games discussed. *Quest for Clues* offers advice in the form of game maps and full "walkthroughs" (step-by-step game solutions in a sequential fashion) for each game listed. Some of the games you don't

Quest for Clues is more than just a hint book; it is an introduction to a variety of games for adventuring newcomers.

one form or another in *Questbusters.* In fact, the whole idea of walkthroughs was originated by Addams and is used exclusively in his adventurer's journal and now in *Quest for Clues.*

As a bonus, Addams wrote an introduction called "The Golden Age of Adventure" in which he traces the current wave of adventure games all the way back to the genre's founder, William Crowther. Addams' discussion is all-encompassing, describing the origins of games and various milestones in history (first role-playing game, first graphics adventure, etc.). Addams interviewed Crowther for the purpose of the introduction and described

"one of the high
ıy adventurer would.
ıe book into five sec-
etectives" (mystery
mes), "Fantasy
ıntures—22 games),
her World" (adven-
ar movies, books and
s), "Just For Laughs"
–three games) and
f-explanatory—nine
e are tips for 50
introduces each
d then goes on to
he clues.
are provided in the
ps), a general discus-
ılkthrough. Addams
alkthroughs himself;

the list of walkthrough contributors reads like the list of *Questbusters'* contributing editors. All the walkthroughs have appeared in *Questbusters* at one time or another, and Addams polished them up and put them together for inclusion in this handsome book.

Some adventure games have clue books available from the game's author or publisher. However, *Quest for Clues* is the only source for clues to games such as the *Phantasie* series, *The Pawn* and *Moebius.* This is definitely a plus in Addams' favor, as is the low price.

Each adventure solution follows a specific format. The game is first described in general terms (goal, etc.), then a walkthrough leads you through the game listing all the locations in the order you must visit them in the game, along with the commands you must execute or type in for those locations. The format is a little different for RPGs because of the non-linearity associated with such games.

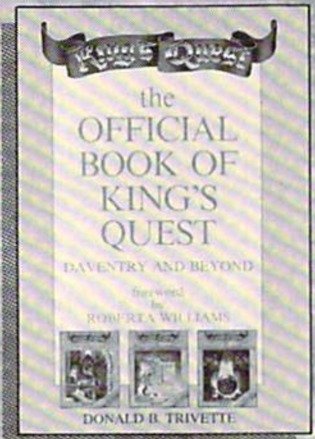
So that you don't reveal more than you want to see, key words in the walkthroughs are encoded using a simple code. Each letter in a coded word represents the previous letter of the alphabet (A stands for Z, B for A, etc.). Addams previously used a code in which you had to go back two letters in *Questbusters,* but stopped using it a year or so ago because people complained that they couldn't read the solution with just a small amount of effort—they had to write down the words. This system works very well in describing the solutions.

The maps are drawn to clearly detail the parts of the game universe you need to see to finish the game. For instance, if parts of a maze are not visited, you won't see them in *Quest for Clues.* For text-type adventures, boxes represent locations, letters and numbers represent special objects necessary to finish the game, and lines between boxes show paths to take between locations. Dotted lines indicate paths that can only be followed after solving some kind of puzzle. I found some of the maps to be confusing, particularly because the directions NE, NW, SE, SW, U and D are not represented with lines coming out of the corners of the boxes and slanted above and below the boxes respectively, as I'm used to. Consideration for this method should be given for any future books. RPG maps are geographical and show general

Continued on page 101

C O M P U T E ' S

HOT NEW SELECTIONS!
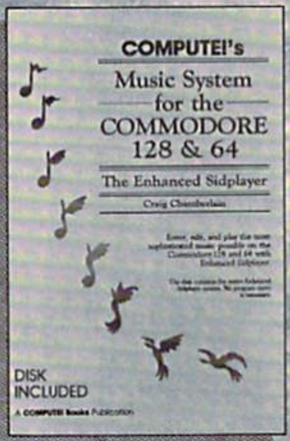


The Official Book of *King's Quest:* Daventry and Beyond
by Donald B. Trivette
ISBN 0-87455-155-2
Retail: $10.95, pb, 144 pp

This is the official guide to America's most popular series of 3-D animated adventure games—the bestselling *King's Quest* from Sierra On-Line. The book provides clues to solving the four *King's Quest* games, maps to help navigate the world of Daventry and beyond, and answers to questions like "What is the gnome's name?" It describes the elaborate programming, artwork, and musical composition that goes into the making of a *King's Quest.* Includes eight pages of color photos showing the stunning graphics that have made *King's Quest* the king of 3-D adventure games.



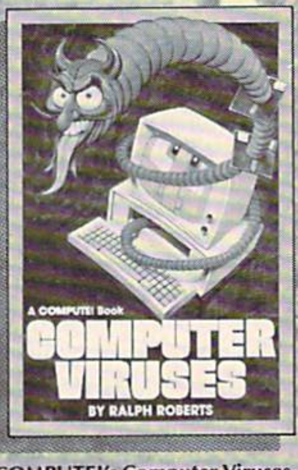
Machine Language Routines for the Commodore 64 and 128
by Todd D. Heimarck and Patrick G. Parrish
ISBN 0-87455-085-8
Retail: $18.95, pb, 585 pp

A must for every Commodore 128 and 64 machine language programmer. Scores of routines that can simply be inserted into your own programs. Included is the assembly language code with easy-to-understand documentation and instructions. *A companion disk that includes all the programs in the book is available for $12.95 (E0858 BDSK).*



COMPUTE!'s Music System for the Commodore 128 and 64
by Craig Chamberlain
ISBN 0-87455-074-2
Retail: $24.95, pb, 274 pp

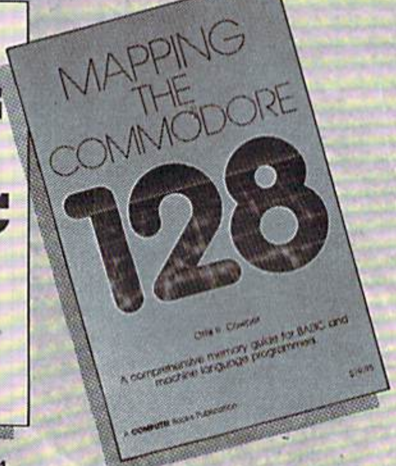
Sidplayer, the powerful and popular music player and editor program, is now more versatile and more impressive than before. *Enhanced Sidplayer* for the Commodore 128 and 64 includes two new versions—one for the Commodore 128 running in 128 mode and another strictly for the Commodore 64. The accompanying disk contains the Editor and Player programs (including a singalong program), utilities, and sample music that you can enjoy immediately or change. *Book/Disk Only*



COMPUTE!'s Computer Viruses
by Ralph Roberts
ISBN 0-87455-178-1
Retail: $14.95, pb, 180 pp

The authoritative guide to computer viruses, worms, and Trojan horse programs. Includes important information every computer user needs to protect against possible disaster—the loss or altering of valuable data. Written in a light yet information style, *COMPUTE!'s Computer Viruses* explains how viruses infect computers, how to protect against them, and what to do if a virus attacks. This book also includes informative reviews of the most popular virus-protection software available. Must reading for every computer user.





Mapping the Commodore 64 and 64C
by Sheldon Leemon
ISBN 0-87455-082-3
Retail: $18.95, pb, 324 pp

This sourcebook has been expanded and now covers the new icon-based *GEOS (Graphics Environment Operating System)* with clear descriptions of how to make it work for you. For BASIC and machine language programmers of both the Commodore 64 and 64C.

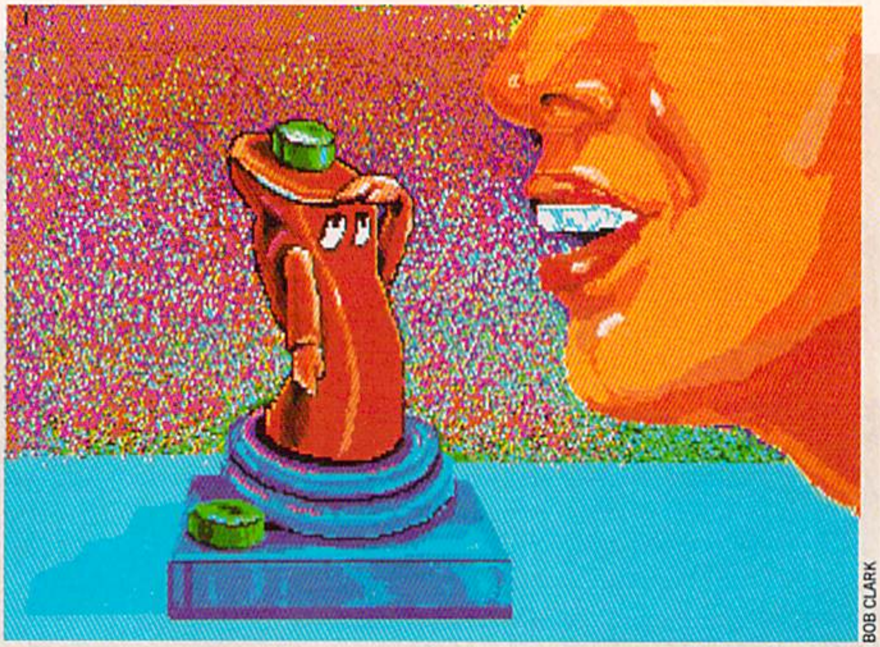
Mapping the Commodore 128
by Ottis R. Cowper
ISBN 0-87455-060-2
Retail: $19.95, pb, 704 pp

The comprehensive memory map and programmer's guide that provides a detailed explanation of the inner workings of the Commodore 128, including memory management, BASIC 7.0, I/O chip register, the operating system, system RAM, and more.

by John Iovine

Voice-Controlled Joystick

for the Commodore 64 and 128


BOB CLARK

Radio Shack has released a new speech recognition chip, the VCP200. Although the chip has a limited vocabulary, it is sufficient for a joystick controller.

Voice recognition is a trendy topic. *(See "Computer Speech and Voice Recognition" on page 70.)* Computer scientists have worked on various algorithms for years. Neural networks recently stepped into the fray, but also with limited success. Some approaches to voice recognition are more successful than others. We will examine one method—the speaker independent.

Speaker Independent

The VCP200 is a speaker-independent voice recognition integrated circuit. "Speaker independent" means that regardless of who is speaking to the chip, the chip will recognize its commands. This is difficult to program since everyone doesn't pronounce words exactly the same. Fortunately for us we don't have to do any programming. The VCP200 is already programmed to recognize a number of commands. There is a trade-off for this convenience; most importantly, there's a limited vocabulary that we cannot change. In addition, this chip can be easily fooled into recognizing non-command words as commands. This disadvantage, however, can be utilized to your advantage. I'll go into this a little later. Consider our voice-controlled joystick a low-budget excursion into the world of voice recognition.

Speaker Dependent

Speaker-dependent voice recognition, in contrast, requires the user to train the computer or voice-recognition circuit to recognize the user's voice and commands. This is a more sophisticated approach that provides some significant advantages. First, the commands are usually programmed by the user. Second, the possible command vocabulary is much larger. Finally, speech recognition is fairly accurate for the user. I plan to design a speaker-dependent system in the future.

VCP200

The VCP200 has two recognition modes. The Command mode and the Yes-No/On-Off mode. The mode of the chip is determined by the voltage on pin 19 of the VCP200. By bringing pin 19 low, the Command mode is enabled. Bringing pin 19 high enables the Yes-No/On-Off mode. We will be using the Command Mode. (See table for command summary and chip pin-out Figure 1.)

Chip Operation

The literature that comes with the chip describes the VCP200's basic recognition operation. The chip performs a spectral analysis of the incoming audio signal from 300Hz through 5500Hz. From this analysis it determines the phoneme class and stores it in a string. Then it compares this phoneme string with phoneme strings it has stored on board. When it finds a match (recognition), it enables that control pin. This is an interesting feat, since this is all happening in real time. My guess is that this chip is using a circulating serial register on the input, although that kind of information wasn't included in the documentation.

Circuit Operation

The circuit (See figure 2) is very similar to the user schematic that comes with the chip. I made minor changes to some component values. Although these changes are minor, they are significant when interfacing into the Commodore joystick port.

It appears that the computer generates sufficient RF to jam the circuit. By adding capacitor C1 220pf we can minimize this interference and obtain reliable operation.

In addition I changed the LED's to subminiatures and increased the resistance of the current limiting resistor to minimize the current draw on the port. Remember, you can only draw 50ma max per joystick port. The LED's are not essential for proper circuit operation. I left them in for visual indication, which you will find very helpful when you start using the circuit.

An on-off switch is essential. This is tied into the +5 volt line. Without this switch you may encounter keyboard problems. Keep the switch in an off position when powering up the computer and for all normal operations. To use the circuit, first load and run your test program or game before you turn on the circuit. (Afterwards, when you're ready to quit, turn off the circuit before you end the program.)

Normal joystick operation is available with the circuit on or off. When it is on, however, you have visual indication via the LED's of the relative position of the joystick.

Trying it Out

When you have completed the circuit and have it installed, you don't need to

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Continued from page 48

load a joystick program to test the circuit. You can use the LED indicator lights. The LED connected to the command pin (See pin-out of VCP200) will light when it recognizes that command.

If you encounter problems, try holding the microphone closer to your mouth and speak directly into it. Try all the commands to check for problems. Also, if you're in a high noise area, that could prevent the chip from responding. In general, the quieter the area the better. If *all* fails, recheck your wiring.

Program

The program is a demo I found in the *128 Programmer's Reference Manual.* It moves a sprite around the screen in response to your verbal commands or joystick movements.

Going Further

The documentation with the chip describes a simple latching circuit that can be added to this circuit. The latching will enable you to hold the Go and Reverse with either the left or right turn. This would be the same as holding down your joystick in an up diagonal or down diagonal position.

If you decide to add this, I advise you to watch your current draw from the joystick port, keep it under the 50ma max.

As stated before, the chip can easily be fooled with non-command words. With a little forethought and testing you should be able to devise your own vocabulary for the chip. Start with words that sound like the command word. (e.g., *release, rehearse, remorse,* for the command word *reverse*).

You can increase the effective range of your microphone by increasing the resistance of the resistors R4 and R7 to 470k. This may increase the amount of static you pick up, and that could render the circuit inoperative, but you may want to give it a try. You also might invest in one of those headphone/microphone combinations—that would keep the microphone a few inches away from your mouth.

Other Circuits

You could use this circuit as the front end to some other interesting projects. However, I wouldn't advise putting this on a model electric car as a substitute for radio control. I could easily envision someone running after the car yelling, "Stop! Stop!" The effective range of the microphone is pretty limited. But a voice-controlled wheelchair is an excellent application worth pursuing.

Figure 1

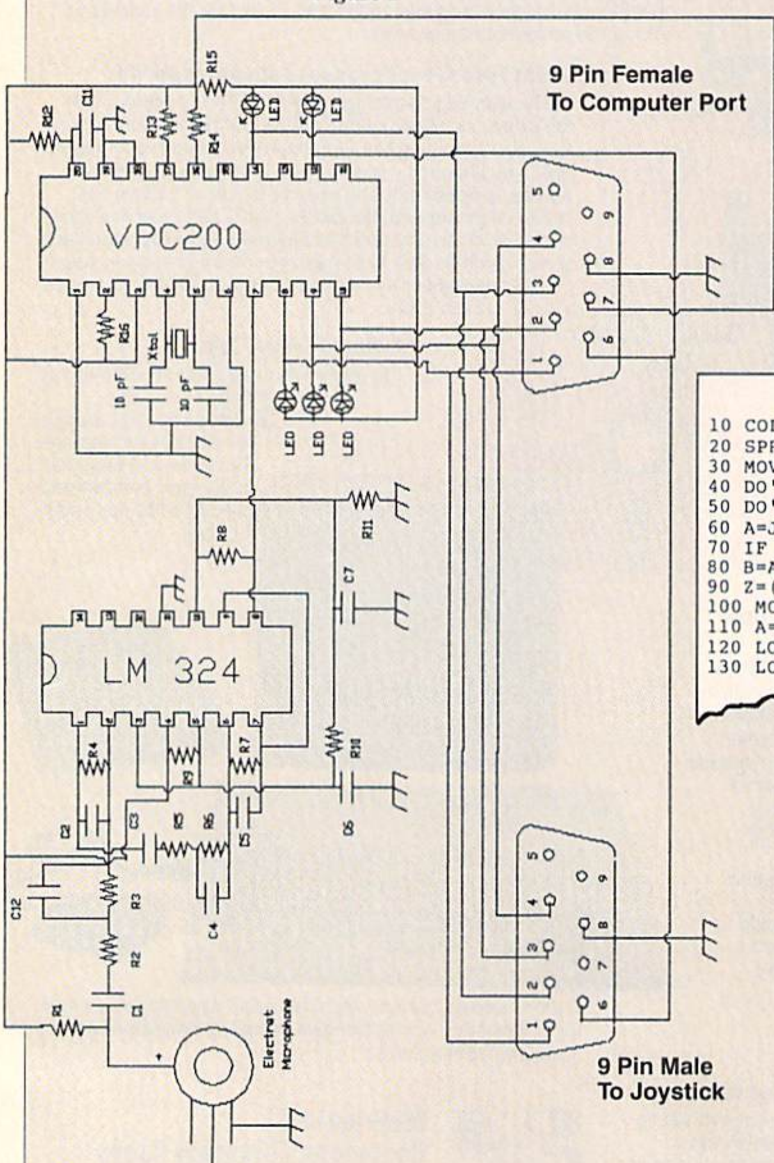
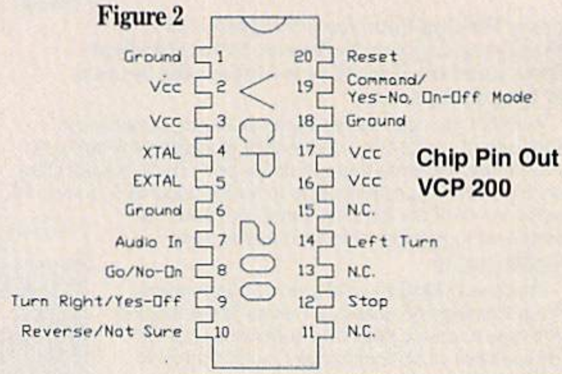


Figure 2



Program

```
10 COLOR 0,2'BDQX
20 SPRITE 1,1,1'BGOY
30 MOVSPR 1,160,150'BKKB
40 DO'BAJA
50 DO'BAJB
60 A=JOY(2)'CESE
70 IF A=0 THEN LOOP'ECOG
80 B=A'BCCF
90 Z=(A-1)*45'DHRI
100 MOVSPR 1,5;Z'BGRW
110 A=JOY(1)'CERX
120 LOOP WHILE A=B'DCEA
130 LOOP'BAKX
```

Joystick Pin #	Joystick Movement	VCP200 Command Mode	VCP200 Yes-No On-Off Mode
1	Up	Go	Yes/On
2	Down	Reverse	No/Off
3	Left	Left Turn	
4	Right	Right Turn	
6	Fire	Stop	

Parts List

see schematic (Xtal)	10 pf
c2	47 pf (max)
c5	270 pf
c3, c4, c12	.01 uf
c6, c7, c11	.1 uf
c1	.22uF
r2, r5	1k
r1, r15	2.2k
r10, r11	5.6k
r3, r6, r13, r14, r16	10k
r9	15k
r12	100k
r4, r7	330k
r8	10 meg
LM324 Quad op-amp	RS# 276-1711
VCP200	RS# 276-1308
Electret Microphone	RS# 270-092
LEDs	RS# 276-026
XTAL 10 MHZ	*
9 pin male	RS# 276-1427
9 pin female	RS# 276-1428

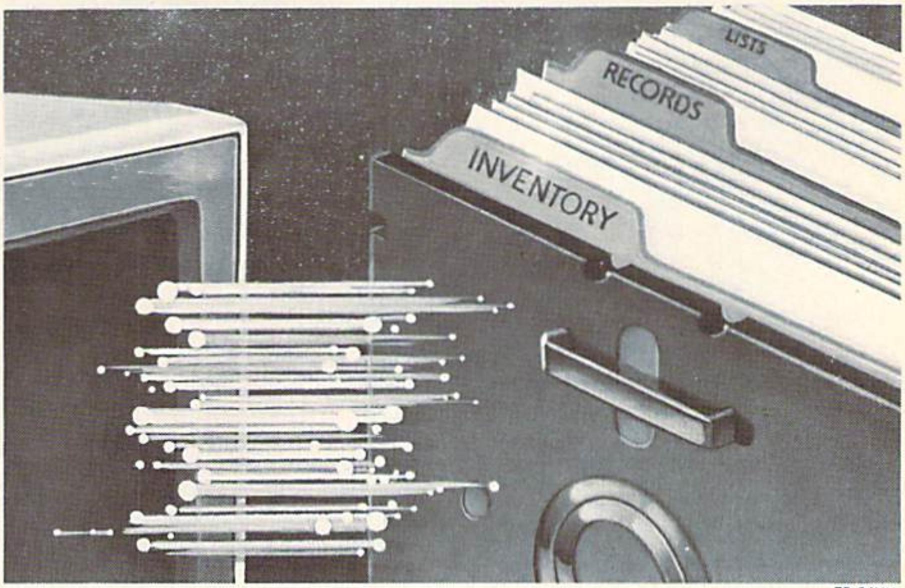
*10 MHZ crystal can be special ordered from local Radio-Shack store. Or from Mouser Electronics 1-800-346-6873

PN# ME332-1100

by Robert W. Baker

The Ultimate Utility

Explore the inner workings of the Q-Link telecommunications service with network pro Bob Baker.



ED SAUK

Several months ago I brought up the subject of using the ARC utility and handling archive files. Well, as it happens, the Omega-Q utility was being released just about the same time that column appeared, and I got quite a few questions about why I didn't include Omega-Q in the column. The real reason is the long lead times in the publishing industry and the fact that my column has to be sent into the editorial offices several months in advance of the publication date. In a fast-moving environment like telecommunications it's sometimes difficult to time the articles with what is actually going on around the system.

In any event, the Omega-Q utility is one that no Q-Linker should be without. With one program you can easily perform dozens of file and disk operations with a user interface modeled after the Q-Link environment. You can quickly select operations by simply moving a check mark to the desired menu option and pressing the F1 key. Or if you prefer, you can even use your joystick to select the options on screen. As an added bonus, the program supports single and dual disk configurations, including the 1581 drive.

The most important feature of Omega-Q is its ability to automatically dissolve archive files created with any version of Archive (ARC), Lynx (LNX), Library (LIB) and Arkive (ARK). The program can even dissolve a disk full of Self-Dissolving ARC (SDA) or SID Music files all at one time. However, keep in mind that this is strictly a utility for the Commodore 64/128 world and cannot handle CP/M, Amiga or MS-DOS archive files.

The really exceptional feature is the ability to handle very large archive files with only a single disk drive. With an optional DESTROY mode, Omega-Q can dissolve a large archive file into the original files while deleting the original archive file, all on the same disk. According to the program's author Robert Stoerrle (MALAKAI), Omega-Q can handle archive files as large as about 648 blocks on a 1541 drive. The reason is that Omega-Q uses a 4K input cache and frees up blocks on the disk in multiples of 16 while the original ARC file is being destroyed.

Bob pointed out that many users having troubles dissolving large archive files with a single disk drive are usually forgetting to activate the ARC Destroy mode or attempting to use ARC Destroy without the Fast DOS activated. According to Bob, the ARC destroy mode can be used only if the Fast DOS is active, so be sure to check your options if you're having troubles. By the way, Omega-Q automatically disables the Fast DOS for any drives that cannot support it. When using combinations of fast and slow drives, the program can coordinate the serial bus to use fast DOS on the drives that support it, and regular Commodore DOS on the others.

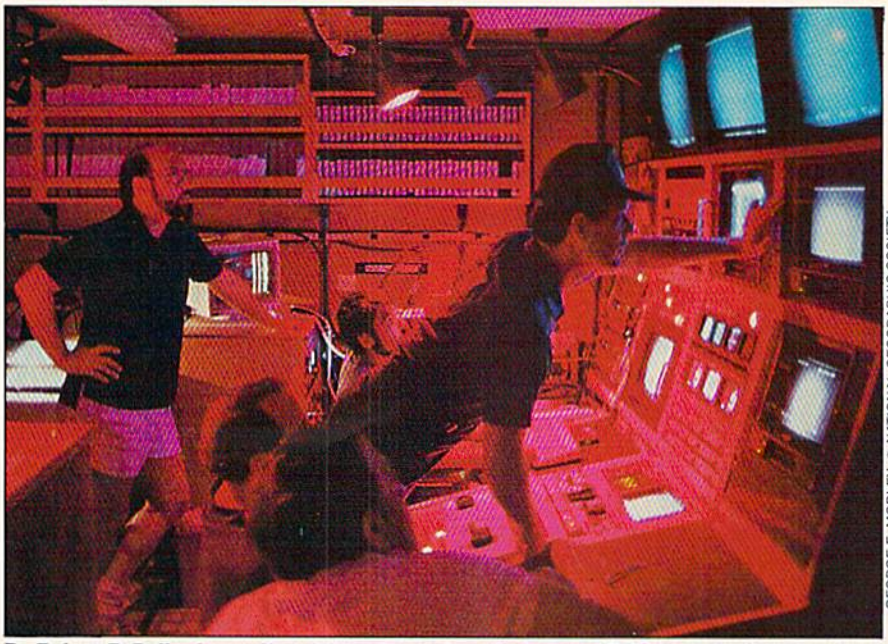
The program includes a few set-up parameters that can be customized to your desired default settings. This includes the mentioned Destroy mode and Fast DOS enable, as well as the number of drives, joystick response and more. When you go to save the defaults, Omega-Q actually modifies itself on the disk instead of using a separate parameter file. However, Bob included a very handy feature where Omega-Q does not look for any particular filename on the disk when it tries to update itself. Instead, the program checks each program file until it recognizes its own header block. So you don't have to worry if you want to rename the program file on your disk, everything will still work correctly. Just be sure you have only a single copy of the program on the disk when you update the parameters.

If you've been using Ultra or Sprint to print saved sequential text files like those saved from Q-Link message boards and E-mail, you'll love Omega-Q. Now you can examine an entire disk, mark selected files for printing, and then print them all in one operation. And that's not all; the available disk operations include locking and unlocking files as well as unscratching or recovering deleted files.

As background information, Bob passes on the fact that this project was started back in March of 1988, with first beta test versions given out in July and the final release version completed last October. The reason that no single-drive copy function is provided is that there wasn't enough memory left over to hold data between disk swaps. The program is rather large, and the source code comprises 12 files that are almost 600 disk blocks in length. I think we all owe Bob a well-earned thanks for this very handy and useful utility provided exclusively via Q-Link. You should be able to find a copy in the Q-Link Utilities Library located in the software libraries available from either CIN or the Software Showcase.

Have you ever seemed to lose a line you've just entered into the E-mail editor when you press RETURN? Well, you may have pressed the cursor key at the same time the RETURN key was hit. Doing this simply scrolls the screen down one line, hiding the line you just entered. If you simply press the cursor up key, the

Continued on page 89



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Dr. Robert D. Ballard (standing right) takes a closer look at an *ARGO* image in the control van. Fellow geologist Dave Gallo is standing to the left, and in the background is Tom Dettweiler.



GEORGE F. MOBLEY, © NATIONAL GEOGRAPHIC SOCIETY

Divers from R/V *Atlantis II* standing on the sail of the DSV *ALVIN* as the crew prepares to dive.

After three quarters of a century, the *Titanic* remains one of the greatest mysteries of our time. To better understand this enigma, let's journey back to April of 1912. Imagine, if you will, a magnificent ship on the open sea towering over other vessels of its day. The *Titanic* was the largest moving object ever built by man. It weighed in at 46,000 tons, and standing upright on its stern the vessel was taller than New York's Woolworth Building (the highest skyscraper at that time).

RMS Titanic also contained the biggest and best of everything money could buy. It was literally a floating palace carrying 43 tons of meat and fish, 12 pounds of marmalade, 2000 quarts of ice cream, and 1500 bottles of champagne and other fine wines. The reciprocating engines were three stories high, while each link of the anchor chain weighed 175 pounds. When fully outfitted, the vessel cost approximately $7.5 million to build (today's equivalent would be about $90,000,000).

The *Titanic* was never officially christened, keeping with the tradition of the White Star Line. The ship had four steam funnels, but the fourth was only a dummy used for ventilation. The extra funnel was added because it made the vessel seem more imposing.

Captain E.J. Smith, a senior officer with impeccable credentials, was chosen to command this ill-fated vessel. He agreed to delay his retirement long enough to take the great ship from Southampton, England to New York and back again completing the *Titanic*'s maiden voyage. Unfortunately, he never even made it to New York City. It's interesting to note that the original blueprints called for 64 lifeboats. That number was later reduced to 32 and finally cut to 16. After all, who needs lifeboats on an unsinkable ship?

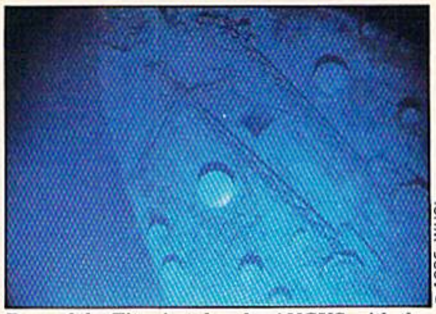
On April 10, 1912, the vessel left the port of Southampton. After making brief stops for passengers and mail (in Cherbourg, France and Queenstown, Ireland), the *Titanic* began its journey to the colonies. Crossing the ocean was scheduled to take seven days. Captain Smith had chosen to follow the Great Circle Route, a northern course that would get him to New York in record time. The first four days of the voyage were practically uneventful. First class passengers enjoyed working out in the elaborate gym, eating at the French sidewalk cafe, and rubbing elbows with the cream of society. Other passengers were isolated from the first class section of the ship.

About 20 minutes before midnight, on April 14, the *Titanic* experienced a sudden jolt. By midnight, Captain Smith knew the terrible truth: the unsinkable vessel had suffered a deadly wound. The lookout had reported an iceberg in the distance, and many survivors claimed they actually

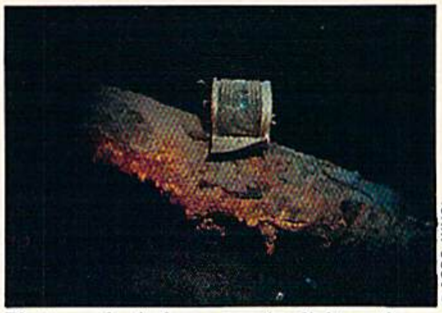
TITANIC:



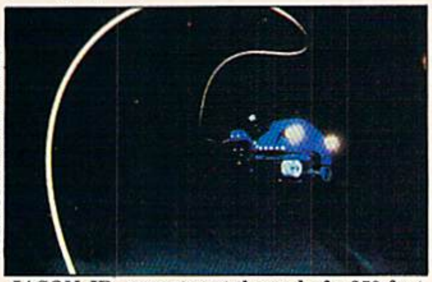
The *ARGO* camera sled was instrumental in photographing the *Titanic* wreck.



Bow of the *Titanic* taken by *ANGUS* with the huge anchor chains clearly visible.



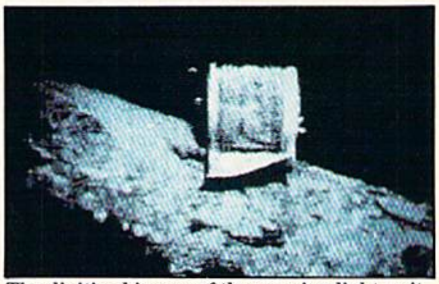
Photograph of a brass running light on the fallen foremast taken by *JASON JR.*



***JASON JR.* operates at the end of a 250-foot tether, its movements controlled by a pilot inside the *ALVIN*.**



The digitized image of the bow as it appears in the program.



The digitized image of the running light as it appears in the program.

saw the mountain of ice near the ship.

Most people believe the iceberg, acting like a giant can opener, cut a 300-foot gash through five watertight compartments on the vessel. Three hours later, the *Titanic* quietly slipped beneath the waves, descending more than 13,000 feet to its final resting place. As the disaster was happening, the *Californian* was clearly visible in the distance. Its wireless operator had gone to bed and didn't receive the broadcast of the first SOS distress call. In the end, there were 705 survivors of this terrible ordeal (of the 2,207 men, women and children on board). No one believed the majestic liner would ever be seen again.

Three quarters of a century went by before the *Titanic* once again became front-page news. On September 1, 1985, a joint French–American expedition, led by Dr. Robert Ballard, discovered the remains of the great ship. Using the research vessel *Knorr* as a base of operations, the team spent a number of days photographing every inch of the wreck site. It seems that the *Titanic* had broken into two pieces as it descended to the depths. The sections rest upright three-quarters of a mile apart. Between the two pieces of the vessel is a vast debris field, containing many items of great historical value. These mementos of the past include: bed springs, corked wine bottles, silver serving trays, dishes and other objects too numerous to mention. Believe it or not, the Ballard expedition didn't disturb anything at the wreck site. In fact, they left behind a memorial plaque, honoring the people who lost their lives there.

In 1986, a new disaster theory emerged: Maybe the collision with the iceberg actually popped rivets and loosened steel plating on the vessel. If things happened in that manner, it could have produced extensive flooding that might have sent the liner to the bottom.

Last year a French expedition returned to the site. They recovered more than 900 artifacts from the wreck and the debris field, and placed them in a permanent exhibit. This venture also yielded another interesting theory. A mysterious 30-foot hole was discovered on the starboard bow that extended down near the waterline. Some scientists believe this hole was produced by a violent explosion in one of the coal bunkers. Rumor has it that a smoldering fire existed in one of the bunkers from the time the *Titanic* was launched.

If this story is true, and an explosion sent the ship to a watery grave, then why blame the disaster on a mountain of ice? The White Star Line could have fabricated the iceberg tale because it was conveniently nearby, and that story made it easier to collect the insurance money. Whatever the case, the *Titanic* remains one of the worst (and most publicized) maritime disasters of all time.

THE QUEST OF THE CENTURY

by John Jermaine





Search for the Titanic

The Company

Last year Leigh Rothschild, president of Intracorp, Inc., came up with a novel idea. He wanted to initiate a bold new project that would allow consumers to dive on the Titanic. *That interesting daydream recently became reality in a store near you. This feature examines* Search for the Titanic *and explains how everything came together. I also talked to Dr. Robert Ballard, the man who located and dived on the* Titanic.

Getting back to Rothschild, he's the 36-year-old president of a Miami-based company. His interests include: racketball, electronics and traveling around the world.

Jermaine: How did you get into the microcomputer software business?
Rothschild: That's a long story. I'm happy to say I went to college for 14 years and finally earned a two-year degree *[he says with a laugh]*. I actually went to college when I was 16½ years old. I presently have a history degree from the University of Miami and an MBA from the same school in business. As a child, I was fascinated with things like Spanish gold, shipwrecks, the *Titanic*, etc.

Speaking of the *Titanic*, I've read everything I could find on the subject. I've also watched and taped both TV specials, where divers examined the remains of the vessel. It was incredible to see rivers of rust and twisted pieces of metal, where expensive teakwood and state-of-the-art equipment existed 77 years ago. Most of us never think of the sea as being that destructive, but the *Titanic* is a good example of what it can actually do.

After graduating college, I became the president of one of the largest electronics companies in Florida. In 1983, I owned what was probably the largest chain of video stores in the country. My interest in electronics eventually led me to microcomputers. Shortly after that, I began thinking about starting my own software business.
Jermaine: Tell me about Intracorp.
Rothschild: The company was founded during the early days of '85, and a program called *Intracourse* became our first release. *Intracourse* is not an X-rated game. When used properly, the program delivers a fully certified Dr. Joyce Brothers psychological profile (which can help you analyze your own personality or that of your friends). Everything was done in good taste, however. In recent months, we changed the name to *Inter-Action* (even though nothing has been changed in the program itself). Ironically, Dr. Joyce Brothers is also an owner of the company. Anyway, I liked the "Intra-" of *Intracourse*, so I altered it a little and tacked on corporation to the title. I guess you could say it was one of those things that came together at just the right moment.

My job at Intracorp is actually two-fold: (1) I'm chief financial officer and (2) a software publisher. That means I travel around the world acquiring software and negotiating deals like *Trump Castle*, *Titanic*, *Miami Vice*, etc. Did I say *Miami Vice*? *[He laughs and quickly changes the subject.]*

The Intracorp facility is spread out over 20,000 square feet, and we have our own printing and duplicating equipment. Intracorp's sales volume is in the $5,000,000 range. One more thing should be said here: our goal is to give you the best software we can find anywhere in the world. *Murder on the Atlantic*, for example, came from France. We're presently working with development teams in England, Germany and the United States. When it comes to making our customers happy, I'm willing to go the extra mile and then some.
Jermaine: Off the record, could you tell me about your new licensing deals?
Rothschild: Off the record [he laughs] *Trump Castle*, for the 64 should be on the market as you read this. It's the first item to be released under the new Capstone entertainment label. *Trump Castle: The Ultimate Casino Gambling Simulation* contains six popular games of chance: blackjack, video poker, keno, craps, roulette and nine different slot machines. You probably wonder why we have so many slot machines in the program. Some machines have three wheels and others have four, while several of them are actually progressive. This means the jackpot will continue to grow, as long as you don't collect it. When all is said and done, *Trump Castle* is an authentic simulation of the games you can play at the Atlantic City casino of the same name. We expect it to do well on the market.

"We wanted to acquire two things for the project: (1) recent photos of the *Titanic* and (2) technical support from someone who had done this type of work." – Rothschild

In March or April, the 64 version of *Miami Vice* will be coming to a store near you. As we negotiated the contract, I told Universal Studios licensing department we had every right to that particular property. After all, Intracorp is based in Miami, Florida, and *Miami Vice* takes place in our own backyard, so to speak. I even threatened to turn them over to the proper authorities if they sold the rights to someone else. John LASTNAME (at Universal Studios) enjoyed this nonsense, and we spent many hours putting together an agreement that everyone could live with. I really can't tell you very much about the project, except to say it will probably be an arcade game based on the popular television program.
Jermaine: How did *Search for the Titanic* get off the ground?
Rothschild: Believe it or not, I came up with the idea several years ago. I didn't get things rolling, however, until June of '87. In the beginning, we wanted to acquire two things for the project: (1) recent photos of the *Titanic*, and (2) technical support from someone who had done this type of work. The pictures could be digitized and used in the program, while an experienced oceanographer would add authenticity to the scheme of things.

Once we determined what was needed for the game, it became necessary to contact the two possible clients. The French team that recently recovered a number of objects from the debris field was a strong candidate for the job. We talked to them about the project, but that was as far as it went.

We chose to work with the Woods Hole people for several different reasons. First

of all, they were the first individuals to locate and dive on the remains of the great liner. Secondly, the Woods Hole Oceanographic Institute was based in Massachusetts, making it easier to work with them on a day to day basis. My brother, Dr. Kenneth Rothschild, had worked with them in the past. He thought we should definitely approach the Ballard people first. Taking everything into consideration, we decided to negotiate a contract with Woods Hole.

Jermaine: What happened next?

Rothschild: Rick Ciravalo, vice president of business affairs at Intracorp, said the Woods Hole people were more than just cooperative. They were excited about the whole idea and ready to strike a deal with us. When all was said and done, we had no trouble obtaining the rights we needed. This was also the time when programmers came into the picture. I'll let Sean Puckett and Jeff Jones tell you the rest of the story.

Jermaine: One more question. Does the *Titanic* still contain valuable material?

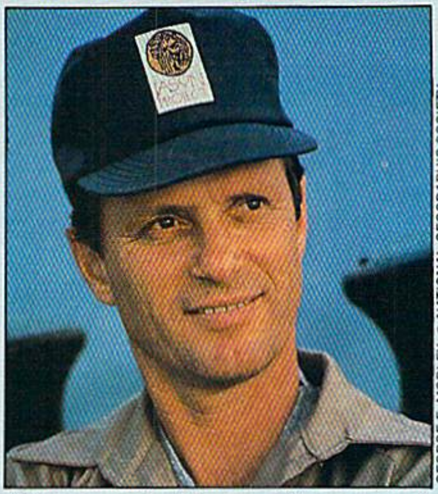
Rothschild: It depends on how you define the word *valuable*. A tea cup, for example, generally has little value. A tea cup that was found in the debris field has instant historical value (even though a similar cup is probably inexpensive). In terms of historic value, the site contains thousands of interesting artifacts. I don't think the *Titanic* contains any gold, but some people believe an incredible cache of diamonds went down with the ship. That shipment was supposedly worth between $40,000,000 and 50,000,000.

If such a cache existed, it would have been stored in one of the purser's safes. The ship's purser was an officer in charge of accounts, tickets, etc. He also had access to several safes that were used to store valuables during the voyage. In the original concept, we challenged the player to locate the gems that were hidden in one of three safes.

Late in the project, however, Dr. Ballard asked us to change the goal of the game. He believed the *Titanic* should never be disturbed. If the user recovered diamonds from our wreck, he was plundering the site and was nothing more than a treasure hunter. We really hadn't thought of that, so I quickly agreed to honor his request. Now you can win the game by finding the three safes and locating everything in the debris field. It took us a while to alter the program, but we're setting a good example for children and future oceanographers out there.

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The Discovery



Although now best known as the explorer of the *Titanic*, Dr. Robert Ballard has for many years been one of the world's leading marine geologists.

In 1985, Dr. Robert D. Ballard discovered the remains of the *Titanic*. That was a great moment in his life, but that accomplishment certainly doesn't sum up his career. For more than a decade, Dr. Ballard and the National Geographic Society have been partners in the exploration of the world beneath the sea. That partnership has yielded eight articles in *National Geographic*, two books, four television documentaries, numerous lectures and several grants. Ballard has published more than 50 articles in various scientific journals and has participated in over 60 deep-sea expeditions, including missions that dealt with the use of deep-diving submersibles.

He has received the Cutty Sark Award for science, the Underwater Society of America Award for science, the Compass Award from the Marine Technology Society, The Boston Sea Rovers Diver of the Year Award, the Citation of Merit from the Explorers Club, the National Geographic Society's Centennial Award, the David Bushnell Award (from the American Defense Preparedness Association), several honorary doctorates and other awards too numerous to mention. Dr. Ballard is also a Commander in the U.S. Navy and the Head of the Deep Submergence Laboratory at Woods Hole.

I recently spoke with this man of the sea, to learn more about the *Titanic* and how that mission is affecting his work today.

Jermaine: Do you consider yourself an oceanographer?

Ballard: I'm really an earth scientist and don't think of myself as an oceanologist, even though people call me one. Oceanography is a very broad term, not a precise one. It covers every field of science (physics, chemistry, biology, etc.) that is currently being studied in the ocean. I study the planet as a system. Since 70% of it is covered by water, I spend a lot my time there. But I still do a lot of work on land. As far as I'm concerned, an oceanographer is a scientist who studies the water itself (the currents, energy exchanges between the ocean and the atmosphere, so on and so forth). I'm interested in the container that holds the water. In fact, I'm more of an explorer than I am a scientist.

Jermaine: What is it like to be an underwater explorer?

Ballard: Exploration is different than basic research. A seventeenth century philosopher said it best: "It's by logic that we prove, by intuition that we discover." Logic and intuition are two different processes. Logic is an exact rational way of doing things, while intuition is an educated guess. A number of scientists use intuition, but they really don't like to talk about it. They just use it. I use it in situations where logic doesn't deliver an acceptable answer. In cases where we deal with total unknowns, I generally have an instinctive pull towards something. That certainly is a controversial way of looking at things (an opinion not shared by many of my colleagues).

The relationship between science and the media is another controversial issue. Newspapers are unscientific and tend to be inaccurate. They're also dedicated to selling things, as opposed to informing the public. The scientific community doesn't trust them very far because they simplify things to the point of distorting the facts, and concentrate on the most spectacular subject matter.

Jermaine: Where did the title "Woods Hole Oceanographic Institution" originate?

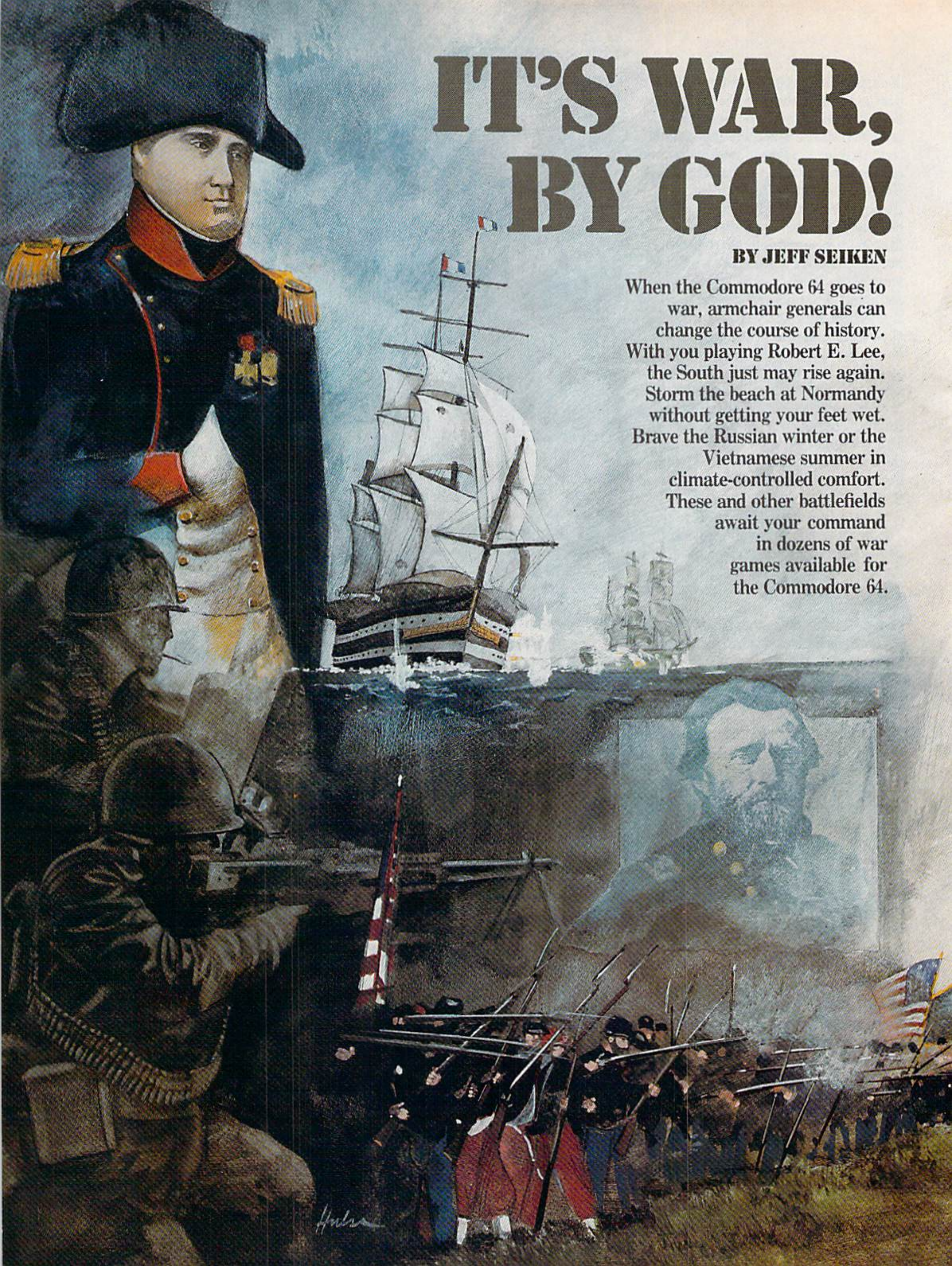
Ballard: I really don't know, but I presume it came from the nearby village which bears the same name. Many years ago, the area was sort of a "woods hollow." It used to be nestled amongst a lot of trees. In New England, people have defoliated entire areas as they built houses, constructed ships and kept warm. So there aren't many forests left around here. Woods Hole is a private, nonprofit research facility, dedicated to the study of all aspects of marine science. The institute officially opened its doors in 1931. Today it contains one of the largest independent marine research laboratories in the world.

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IT'S WAR, BY GOD!

BY JEFF SEIKEN

When the Commodore 64 goes to war, armchair generals can change the course of history. With you playing Robert E. Lee, the South just may rise again. Storm the beach at Normandy without getting your feet wet. Brave the Russian winter or the Vietnamese summer in climate-controlled comfort. These and other battlefields await your command in dozens of war games available for the Commodore 64.



As an avid reader of military history, I made one simple discovery early on. History is immutable. Once an event occurs, its outcome remains fixed in time and place forever. Pick up any number of books on the Battle of Waterloo, and you'll see that Napoleon goes down in defeat in every one of them. By the same token, I also came to realize that history holds no surprises. Not only is Napoleon destined to lose at Waterloo, but always for the identical reasons, his plans undermined by the same missed opportunities, the same blunders, the same twists of bad luck. Interpretations as to the significance of various factors may vary, but the general pattern of his defeat repeats itself in book after book on the subject.

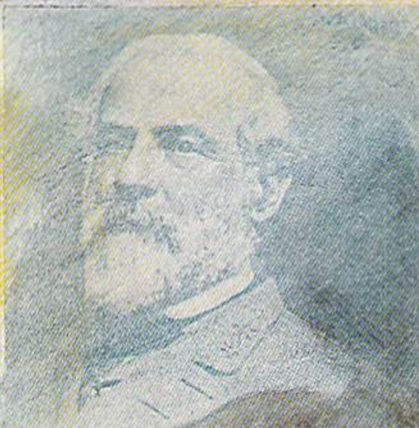
Computer war games offer you the opportunity to break this iron cycle. In a sense, the past becomes unwritten, a book of blank pages to be filled in according to your own design. And this observation cuts to the heart of the appeal of playing a war game: it lets you experience history in a fresh light not just as an observer, but as an active participant. "Can you, as Ulysses S. Grant, stop the Rebs at Shiloh? Can you, as Robert E. Lee, save your Army from disaster at Antietam?" reads the promotional blurb on the back cover of *Decisive Battles of the American Civil War, Volume One.* The questions present an invitation as well as a challenge. At the same time, there is more involved to playing a war game than trying to recast history or outperform a famous general.

A good simulation also deepens your understanding as to why events happened as they actually did. It's one thing to read about the supply problems that plagued the British and the Germans during the North African campaign in World War II. It's an altogether different proposition to watch your offensive grind to a halt due to a crippling fuel shortage in the middle of a game of *Knights of the Desert.* In demonstrating the importance of supplies to your army's operations, the game gives you a firsthand look at how logistics shaped the conduct of the historical campaign.

The firsthand perspective a war game provides can likewise lead to some unexpected insights into the subject the game seeks to simulate. For example, Hitler's decision to suspend the German drive on Moscow for several months in favor of a concentrated attack on the Ukraine during the invasion of Russian in 1941 has long been considered one of the major blunders of the war. Yet, let the same situation arise in *Russia, the Great War in the East*, and you'll find that there are some very compelling reasons for adopting a similar strategy.

On the other hand, a war game also makes a wonderful vehicle for exploring the "what-ifs" of a particular battle or campaign. History is loaded with them, situations where a different set of actions might have completely altered the course of subsequent events. To continue with the example above, what if the Germans had made an all-out effort to reach Moscow in August of 1941? Could they have succeeded? And how would the capture of the





JESSE HULSE



Russian capital have affected the outcome of the war? In a book, these kinds of questions can never amount to more than conjectures, intriguing to consider but hypothetical nonetheless. But in *Russia*, you can proceed with the drive on Moscow and see what happens yourself. A war game opens up all of these roads-not-taken and lets players blaze their own trails through the past.

Lest you get the wrong idea from all of the preceding, however, an advanced degree in military history is not a prerequisite for appreciating and enjoying a war game. Stripped of all its pretensions, a war game is—like any other computer game—first and foremost a contest. While an arcade game might test your quickness and dexterity, a war game presents an intellectual challenge, very much in the spirit of chess.

In fact, the typical war game is really no more than a souped-up variation of chess, with the abstractions of the chess board replaced by a true-to-life model of some real event. Your overall goal in either activity remains the same: to outwit and defeat your opponent (even if that opponent happens to be nothing more than an artificial intelligence routine embedded in the game program). It's surprisingly easy to overlook this aspect; yet, the pleasures of competition that attend playing computer war games comprise an important part of their appeal.

The War Game Categorized

The easiest way to classify the dozens of different war games currently on the market is by subject. A game's subject matter provides a quick point of reference: to say that a particular game simulates carrier battles in the Pacific during World War II, for instance, immediately tells you something about it. Not surprisingly, despite the fact that history from ancient times to the present day has provided designers and publishers with an abundance of source material to work with, most games stick to a handful of popular subjects. A war game, after all, is a commercial venture, and the tastes of its intended audience must be taken into account. A game on an obscure topic is at a great disadvantage when competing against one that strikes an instant chord of recognition with potential purchasers, regardless of the relative qualities of the two products. Thus, it's the rare release that strays outside the bounds of conventional interests.

World War II by far ranks as the favorite subject of choice and for rather obvious reasons. It stands as the greatest conflict the world has ever witnessed and to this day continues to bulk large in our national conscience. A glance at the catalogs of Strategic Simulations, Inc. (SSI) and Strategic Studies Group (SSG)—two of the leading publishers of computer simulations—gives an idea of the extent to which games about World War II predominate. Roughly 50% of SSI's and 70% of SSG's war games treat with some aspect of the struggle. A brief sampling: *USAAF* (SSI) and *Europe Ablaze* (SSG) cover the battle for control of the skies, *Warship* (SSI) and *Carriers at War* (SSG) deal with the war at sea, and *Knights of the Desert* (SSI) and *Battlefront* (SSG) recreate different land campaigns in Europe, the Pacific, and North Africa. For all of the attention War World II has received, however, the sheer magnitude of the fighting and variety of settings in which it took place ensures that its possibilities are in no danger of being exhausted soon.

Next on the list but gaining in popularity is the subject of modern warfare. A few of the games that fall under this heading, such as *Golan Front* from Simulations Canada (SC) and *Conflict in Vietnam* by MicroProse, simulate actual events, but the majority focus on hypothetical conflicts. For example, Avalon Hill's *Gulf Strike* examines a U.S.–Soviet Union confrontation in the Persian Gulf, while SC's *Seventh Fleet* looks at a clash between the superpowers in the Pacific. To an extent, games of this sort represent an exercise in the theoretical, but they are still meant to provide an accurate reflection of the strengths and capabilities of the combatants as they exist today. War games based on contemporary subjects carry the added appeal of timeliness that their history-bound cousins lack.

Last year, in the middle of the debate over President Reagan's decision to flag tankers in the Persian Gulf, Electronic Arts published *Strike Fleet*, a simulation of modern naval warfare. "As realistic as tonight's six o'clock news" its advertising flyer proclaimed, noting that the game featured a scenario about American vessels escorting Kuwaiti tankers in the Gulf. It's hard to imagine a release more topical than that (although some might argue that the ad—or the game—was a little too topical for comfort). Several years ago, in the wake of the American bombing raid on Libya, the *New York Times* refused to carry a MicroProse ad promoting the fact that *F-15 Strike Eagle* included a Libyan air strike scenario.

The Civil War takes third-place in our survey, thanks largely to the efforts of SSI and SSG, both of which have published a series of games on the subject. SSI unveiled *Battle of Antietam* in 1986 and has followed up its release with three other titles, the latest being *Shiloh, Grant's Trial in the West.* SSG, in turn, has published *Decisive Battles of the American Civil War, Volumes I, II* and *III*. A small company called Garde has also contributed *Blue Powder, Grey Smoke,* but that game appears to be the only other entry in an otherwise still uncrowded field.

Finding a game on a subject other than one of the above is very much a hit-or-miss affair. Some topics, like World War I remain unexplored territory. But sometimes, an odd sort of synchronicity operates in the market. By way of an example, for years enthusiasts of naval warfare during the age of sailing ships had to be content with *Broadsides* (SSI), a game that was fun but limited, in that it simulated single ship duels only. Then, almost on the heels of one another appeared *High Seas* (Garde) and *Wooden Ships and Iron Men* (Avalon Hill), two games recreating



single ship and fleet actions of the era.

Subjects have a way of coming into vogue like this, and the Napoleonic Wars look to be next in line. Largely ignored by companies in the past, the period has suddenly enjoyed a boom in popularity: Datasoft is offering a repackaged version of Krentek's *Napoleon in Russia,* SSI has come out with *Battles of Napoleon,* and SSG is promising to publish its own Napoleonic construction kit.

Using subject matter as a guide is the most obvious way to survey the range of war games currently available. Yet, another way to review the market on a basis that draws equally meaningful distinctions among games is to classify them according to level. By this term, I mean the level at which a game addresses its subject. War games come in three basic levels: tactical, operational and strategic.

Tactical level games focus on a single battle, usually in some detail. Within the loose constraints of this definition, though, the scope of the battles recreated can vary considerably from title to title. Take *Computer Ambush* (SSI) and *Rebel Charge at Chickamauga* (SSI) both of which fall under the tactical level heading. In the former, turns represent a few seconds of time, and the number of men involved in the fighting totals around twenty. With the latter, each turn equals two hours, and the size of the combatants tips the scale at around 100,000 troops. So as you see, a huge difference in scope often separates one tactical game from the next.

Operational level games like *Fall Gelb* (SC) or *Operation Market Garden* (SSI) are concerned not with one specific action, but with a series of engagements over the course of a campaign. The operational level simulation takes a step back from the up-close look provided by its tactical level counterpart. Instead of featuring time and map scales measured in hours and yards, it recreates weeks of fighting waged across miles of terrain. Consider this comparison: a complete scenario of the tactical level *Battlegroup* (SSI) would not be the equivalent of even one battle resolved in the course of a single turn in the operational level *Battlefront.*

Strategic level games provide a broader picture still, covering swathes of time and territory stretching into the years and thousands of miles. Games that present this sort of grand vision are rare and only a handful of titles truly deserve to be called strategic. Possibly the most ambitious of all is *Russia* (SSG), which simulates the Russo–German War in its entirety from the initial invasion in June 1941 to the fall of Berlin in April 1945. *Siege in Africa* (SC) affords the three-year struggle for dominance in North Africa a similar, comprehensive treatment.

Not all games, however, neatly fit into one of these three categories. Many straddle the line between levels. For example, *War in the South Pacific,* (SSI) with its 11-month-long campaign scenario and map encompassing an area of more than four million square miles, certainly merits the strategic level label. Yet, the game also approaches its subject from a very tactical perspective, breaking the action down into one-hour turns and requiring players to resolve such questions as the type of ordnance planes will carry on every airstrike.

More importantly, the labels that are commonly attached to war games clue into external qualities only. They don't reveal what lies inside the shrink-wrapped package. For instance, both *Shiloh* and *Decisive Battles of the American Civil War* call themselves tactical-level simulations of the Civil War, but despite their common subject and level, the two games work vastly different in play. What accounts for these differences? Each title is built around a distinctive game system.



The War Game Dissected

A war game attempts to create an illusion of reality. How a particular game fosters this illusion is dependent upon its game system. The game system is the sum of a war game's parts, a synthesis of format, viewpoint and mechanics of play. When comparing or contrasting one computer war game with another, what you are really doing is discussing differences in game systems. It almost goes without saying that learning how to play a computer war game is essentially a process of understanding its game system.

Format refers to the routines by which the computer conveys information to the player and the player communicates his orders back to the computer. In most game systems, these routines revolve around a set of menus. The menus provide you with access to reports on the status of friendly and enemy forces and allow you to issue orders to the troops under your command. The number and structure of the menus, however, can vary considerably.

Carriers at War, for example, features an elaborate system of 30 interlocking menus, but the menus themselves are simple in design. The typical menu presents perhaps four different options. You highlight the one you desire with the cursor keys and then hit RETURN to implement your decision.

Panzer Strike (SSI), in contrast, works off of only two menus, but each offers a plethora of choices calling into use practically the entire keyboard.

Then there are those game systems that dispense with menus altogether. For instance, in *The Road to Moscow* (Game Designers' Workshop), you dictate commands to your units via the joystick-controlled cursor.

Most game systems require players to review the current situation and issue a fresh batch of orders at the beginning of each game turn. After you finish entering orders, the computer proceeds to resolve them, thus completing one turn and proceeding to the next. Less common is the game system that breaks the turn into a number of distinct phases, asking for player input at several intervals. For example, in the course of a single turn of *Wooden Ships and Iron Men,* the computer prompts the player during eight separate phases. Lastly, some systems run in accelerated real time. In this case, the

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Those Generous Pirates

Software piracy is not the "victimless" crime its advocates say it is. Piracy is ultimately detrimental to all computer users, and it may actually threaten the survival of software publishers in the 1990's. In a world without piracy, software companies could be assured a fair return on their investment, and users could look forward to an abundance of quality, non-copy-protected software at lower retail prices.

BY GARY V. FIELDS

He was a large man with eyes and teeth which winked from his massive beard as he laughed. As he sat in the front row in the user's meeting, the first thought that came to my mind was that some day, when this man's hair turned gray, he would make the perfect Santa Claus. Because of his physical appearance it was easy to imagine him dressed in red and promising excited children their special wishes while bouncing them playfully on his knee. But with one boastful remark he revealed he had already become "Santa" to at least some computer users.

When someone mentioned software piracy, he leaned back his head, chuckled and unabashedly said, "Yes, when I was using my first 64, I was one of the biggest pirates you've ever seen." From that remark it was obvious that, despite his appearance, he imagined himself more a Robin Hood than a Santa Claus. At the same moment, my vision of him as Santa Claus abruptly distorted into a vision of Blackbeard the pirate. Casually, he boasted of loaning a trunk full of software to anyone who asked. When questioned how he could collect such a massive amount of software (he claimed thousands of titles) he just smiled and with a wink said, "Oh, there are ways."

During the six months I've spent researching this story this sad fact continued to surface: at the same time software developers are finally starting to loosen the bonds of software protection, software piracy seems to be worsening. According to one estimate, nearly half of the software in circulation today was acquired illegally.

Rainbow Technologies, a developer of software protection hardware, says that in 1988 $3.5 billion worth of software was sold worldwide, but at the same time $3 billion was lost to developers through piracy. Unlike most crimes, relatively few software pirates get involved in an effort to harvest financial gains. In most cases they view their activity as honorable—they are simply being generous by "sharing" what they possess. Whether they don't understand the consequences of their crime or they simply ignore the truth, pirates annually rob software developers of millions of dollars of profit. But the damage does not end there. The cost of piracy affects more than just the software industry, it hurts the honest software customer too—through higher prices, fewer choices and copy protection schemes.

I wish I could say I have rubbed elbows with only a few pirates in the past six years, but I'm afraid the opposite is true. It seems that no matter where computer jargon is spoken, piracy is practiced—whether at the monthly meeting of a local user group, at a national computer show and or in the aisles of the local software shop. I have actually been offered illegal copies of copyrighted software by people whom I had just met. I can only assume that this casual approach to software theft is due to ignorance. So let's define what software piracy means, who the average pirate is and why they pirate software; then we'll offer some suggestions on how to curb the practice.

Almost everyone I talked with discussed their software collection and how they built it with an almost blasé attitude, as if their activity was no more questionable than something along the lines of taking apples from a neighbor's tree. They knew they were "collecting" software without the legal owner's permission, but they seemed sure the publishers would never notice or just wouldn't mind them taking a few. Their relaxed posture quickly changed as soon as I told them I was developing a story about software piracy. From that time on, they tended to remember less and less about where they got their software and were anxious to change the subject.

In writing this story I was forced to do some soul searching myself. So let me begin by confessing that I too have been guilty. When I scraped enough money to-



gether to buy my first 64, the added expense of buying software really strained the family budget. During the first year I averaged spending around $100 a month buying the business software I needed and the entertainment software I wanted. In 1989 that amount may not seem so great, but in 1982 my car payments were under $100. So when a friend offered me a disk full of arcade games I couldn't resist. At the time it seemed the smart, affordable thing to do. But no matter what argument I used to try to convince myself that possessing the software was okay, I could not. In the end, my only choice was to erase the disk and forget the games.

Identifying a Pirate

If you are looking for tell-tale markings which identify a software pirate, you won't find any—they come in all sizes, colors, sexes and ages. It seems that the same person who would never dream of walking out of a K-mart with stolen watch hidden in his jacket, doesn't think twice about stealing software. If you were to try to assemble a composite of the average pirate, you would probably come up with someone like this: a white male, age 25–35, with at least two years of college. He is married, owns more than one computer and uses it for entertainment more than business. He spends three to five hours with his systems each day, treasures his subscriptions to several BBS networks, reads at least three computer magazines every month and is considered by his neighbors the salt of the earth. In most cases he is generous to a fault and doesn't hesitate to duplicate any disk he can get his hands on. Beyond that, about the only thing software pirates have in common is their love for computers and an excuse for collecting pirated software—not the same excuse, just an excuse.

Here are some of the more common arguments pirates try to use to justify their activity:

"Software is too expensive."

The complaint that software is too expensive is not new. But while many of us may think BMW's are overpriced, few of use go out and steal one. If anything, pirating software is part of the reason software prices are as high as they are. Most of the software distributors I talked with insist that software prices would probably drop if "pirateware" were eliminated.

"I own the software."

On the surface this argument has more merit than most used for software pirating. The thread of the argument goes like this: Since I bought the original program and the disk I copy it to as well as the hardware which performs the duplication, how could I be stealing from anyone? That sounds good until you consider that the true value of the program is not the magnetic medium it is stored on, but the time, knowledge and work put into organizing the code on the disk. That is why the software can be copyrighted in the first place and why the courts uphold the legal rights of the owner of the copyright.

"Everyone does it."

The statement is false, not everyone steals software. But even if it were true, it would still be illegal.

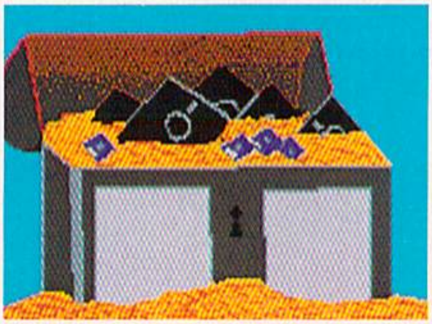
"I'm a collector."

We all collect something—music, books, string, tinfoil—but we all *pay* for what we collect. And once you begin collecting, it can become an addiction; it's not the object that's important, but simply the need to complete a never-ending collection.

"I've been burned too many times buying software."

One argument pirates use to justify their activities is that much of the software they possess, especially games, are used only once—simply to see what it looks like. They contend, with justification, that forking over $30 (or more) for an untested arcade game could be compared to what we in the South call "buying a pig in a poke."

Thus, despite the fact that it is illegal, they view collecting pirated software as the easiest and only affordable way to test a product before buying. I know of at least one user who does exactly that. But to his credit, after he's tested a program, if he likes it, he turns around and buys a legitimate copy. He says he decided on this approach to software buying out of financial necessity. He bought a $200 dollar database to use in his business only to discover after wrestling with it for a month that it contained major bugs the developers were aware of when they shipped it, and it lacked the features listed in advertisements. He says after an unsuccessful attempt to get satisfaction from the company he turned to piracy. Using this method, he says he tested a pirated version of *Superbase Professional,* decided it was the database he wanted and bought a copy directly from the distributor.



"Breaking software protection schemes is a game."

Some hackers see the breaking of software protection schemes as a game and actually enjoy that activity more than the program itself. I don't know of any legal reason why you cannot dissect a program you own. Unfortunately, most hackers break a software's protection code not for the fun, but to make it easy to duplicate for others.

Who Owns the Software?

The legal owner of a software program owns that single copy and nothing more. Your rights to the software are exactly those of any other property you own. You have the legal right to make a working copy of your programs—for your own use. If you want to *trade* software with a friend, that's fine—as long as you don't keep a copy for yourself. Too many people want to treat software like a pregnant cat—they want to keep the original and distribute the litter (copies) among their friends. This is where the line between generosity and theft is usually crossed. If you want to let your friend try a program for a day or so, that's fine (as long as the original doesn't go into "labor" at the friends house!). In fact software developers are usually delighted for potential buyers to have their software shown by a friend—there is no better salesperson than a satisfied customer.

Trip Hawkins, founder and president of Electronic Arts, has strong opinions on the legal and financial problems of software piracy. "To be perfectly honest, software piracy is a very big problem," said Hawkins. "Some users don't realize they are breaking the law when they share copies of software, but others know perfectly well they are breaking the copyright laws. It is a real problem. We want to be here in the future, but piracy could destroy the industry. To give you an example of how widespread the problem is, consider our *One-On-One* basketball game. We sold 300,000 copies of that program, but there are probably a million illegal copies out there. Maybe all of those people wouldn't have bought it if they hadn't got-

ten an illegal copy, but probably half of those would."

Can You Sell Your Software?

There are some software companies (primarily distributors of business software) which require the customer agree to a license agreement instead of ownership of their products. Although the legality of such restrictions has yet to be decided in the courts, my advice is to contact the developing company of such software before selling or buying a copy and get their advice. When legal rights are in question, the safe approach is to ask before acting.

Fortunately, most software packages are sold directly to the user with no such licensing strings. You own the software and can do with it as you choose. If you tire of the program or perhaps upgrade to a newer system, you have the right to sell or give the original to someone else. Just be sure to resist the temptation to keep a copy for yourself. Just as you couldn't sell your automobile and keep a copy in the garage, you can't legally sell your software and keep a copy too. The temptation of software piracy is built into uniqueness of the product (along with record and video producers) which makes it possible to "have your cake and eat it too." It may be possible, but it is not legal.

Where Does Pirated Software Come From?

There is no single source of pirateware. Much of it began as a legal purchase which the owner chose to "share" with a friend who did the same with another friend, etc. It can also be found on bulletin boards run by Sysops trying to attract a large following. An even more disturbing development is—for lack of a better term—underground networks which distribute illegal software through the mail. In the past years these networks have become so organized they actually print and send catalogs to their subscribers. Other software pirates try to disguise their activity as legal businesses.

To illustrate the point, Trip Hawkins gives two examples: "A company in Singapore offers all kinds of programs for sale which violate the copyright laws. Another company in Canada offers software as 'rentals.' But after the rental period has expired, you are supposed to delete the programs but not return the disk. Well, obviously they are making illegal copies."

Apparently another source is employees of the developers themselves. It seems that some of the pirated software leaves by the back door of the developer's own



shop. People employed as beta testers have also come under suspicion, since much of the pirateware being distributed today is not the final release version of the program. The activity of software pirates is not bounded by international borders either, as is evidenced by many European titles being circulated inside the U.S. which have not officially been marketed here.

Another alarming source of illegal software is the retail stores themselves. In an effort to lure more hardware buyers, some retail sales people have offered "free" software to their customers. As an example: At one Amiga users meeting I attended, a new owner was eager to show the "great public domain" game he had been given with the purchase of his Amiga 500. The game turned out to be a broken copy of *Crystal Hammer*—a great game, but certainly *not* a public domain offering.

Is Free Really Free?

The old saw, "you get what you pay for," holds true with software. I can remember trying to get my father to help me buy a beautiful used, sports car when I was a teenager. On the surface it looked great because it had a beautiful paint job, but under the paint was a worn out motor, supported on tread thin tires and united by a slightly bent frame. While my eyes saw only an affordable thrill car, my father looked beyond the paint job and saw a bargain-priced mistake.

Such comparisons between true and false value carry over to the issue of pirated software. While on the surface much of the pirated software may appear to be a bargain, underneath the code may not measure up to what you should expect from commercial software. Let me explain:

One of the first things you will discover if you dabble in piracy is that much of it is beta version software not the final release software. That means the software is not finished—some features may not be included, major or minor bugs may remain, and there is little—if any—documentation. At first glance this software may appear to be excellent, but a few system lockups caused by bugs or data lost because the final error-checking routines were not yet installed, will quickly turn most users off to the program. This is sad for two reasons: you've wasted your time (and perhaps money), and a potentially good program will be born with some users already claiming it is defective.

I witnessed that exact scenario in an Amiga users meeting last summer. I offered to demonstrate the review copy of Rainbird Software's *Carrier Command* I had just received. One of the fellows in the crowd booed my suggestion with the remark that the program was of poor quality. I was surprised, because my own impressions of the game indicated the exact opposite—in my opinion *Carrier Command* is one of the best Amiga strategy/arcade games yet released. As I booted the game he continued with his objections, claiming the program was full of bugs and the action was slow. I finally turned and asked him how he knew so much about the game, and he replied that he had been playing with it for about a month. Because (at that time) *Carrier Command* had been out for less than a week, I asked him if he was sure he was talking about the same game. After a couple more questions he sheepishly admitted his incriminating remarks were based on a beta version of the game which he had downloaded from a pirate bulletin board.

I don't mind that he got what he paid for—nothing, but what is sad is that others who are interested in programs they have seen advertised are often influenced by such negative remarks based solely on false information gleaned from pirated software. It is only natural that any of us would put more weight on the personal evaluation of software over the remarks

Continued on page 96

by Mark Jordan

Dr. Geo and Mr. Calc

Berkeley Softworks' series of GEOS-compatible products opens up a world of opportunity to Commodore users. Take some tips from Mark Jordan and soon you too will be Pumping GEOS.



MIA BOSNA

Suppose you are asked to help on a computer program design team. Your task is to critique the user interface during the development process. Sounds like an end-user's dream, doesn't it? Naturally, you immediately agree to help.

One day's mail brings the alpha-phi-kappa-zappa version. "Critique by morning" is the urgent message. You immediately check to see if the mouse is supported. It is. How about the all-essential keyboard shortcuts? In place. But are they mnemonic devices (such as COMMODORE/B for bold)? Yes. Drop-down menus, pop-up windows? It's all there and oh-so-convenient. Click, click, click. You love it.

Oddly, you're disappointed. This program's perfect. What'll you tell the programmers tomorrow? But wait, there's one last test: is this program intuitive enough that your non-computer wife/husband/friend can sit down and start using it? You go get your wife/husband/friend and stand back to observe.

It passes.

The next morning the programmers come in smiling. They ask you if you have any suggestions. You lamely say, "Oh, yeah, maybe you could change the default colors."

Bigger smiles. "That it?"

Beaten, you nod. "I admit it, I can't find any fault with it. What are you going to call this program, anyway?"

GeoCalc, comes the reply.

That's right, folks, *geoCalc* is intuitive. As far as user interfaces go, this spreadsheet from Berkeley is about as easy to learn to use as any I've ever seen. My first impression was joyous.

But I must warn you: *geoCalc* has a split personality, à la Dr. "Geo" Jekyl and Mr. "Calc" Hyde. As Dr. Geo he is friendly beyond belief (as mentioned) and full of trait: speed. Or rather, the lack of it. Give him a big task and he's as slow as traffic around an accident. This lack of speed is not a tragic flaw but certainly one that users will quickly become aware of after purchasing the product. There are ways around it, a few of which will be discussed in this article.

Dr. Geo
[Happy Background Music]

I assure you, learning to use a spreadsheet with *geoCalc* is a joyful experience. I speak from experience. Before I first booted up *geoCalc,* I was a non-spreadsheet user. I'd read about them, I understood the concept, and I could see their value in a business environment. But I never had what I felt was a real need for one. Here's how I started.

I booted up, installed my disk, etc. I clicked the Create box. The familiar GEOS command menu at the top greeted me. Also familiar was the file-folder title bar on the right at the top. The rest was new to me. At the top center was a little box with arrows (scrolling, no doubt). The second line on the screen was mainly blank: a checkmark (√) and an X were about the only visually interesting things there. At the bottom were some more cryptic symbols which included more arrows (more scrolling, I bet).

All these items were non-threatening. They also were the least significant portion of the screen. What was significant was a grid.

A grid is what spreadsheets are all about. It is normally called a worksheet, and it is nothing more than ruled rows and columns. *GeoCalc* has 256 rows and 112 columns. If put on paper, this would call for a big piece of paper. And that's how you should think of a spreadsheet—as a big piece of paper. It's too big, naturally, for the screen to show all at once. My 128 mode, 80-column screen showed only columns A–F and rows 1–13.

So what good is this grid? Plenty. It allows you to type in numbers or letters. Of course, a word processor lets you do that. A spreadsheet must do something about those numbers and letters. And it does, for the numbers anyway. It "operates" on them. You must decide what operations you want done. Want some examples? How about adding: you could have your spreadsheet automatically add cells on your worksheet. You can also subtract, multiply and divide. But that's just the beginning of the power of a spreadsheet. You can do financial calculations, trig calculations, statistical calculations, scientific calculations . . . just about any type of number crunching that ever needs to be done.

When I first saw the worksheet, I noticed the first cell on the screen (upper-left) was bounded by a dark border. "That must be the Active cell!" I shouted. The mouse pointer was also on the screen. "That must be the mouse pointer!" I shouted a second time. Then I noticed in that mostly-blank second line just to the

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Pumping GEOS

Vol. 1, Num. 8

Loan + Loan = Temporary Happiness

Creating a worksheet to perform loan payments with **geoCalc** is as easy to do as it is handy to have. Here's how I got the one, shown here into action.

I started by typing in the headings in columns B, D, and F. Beneath each are the 3 data items needed by geoCalc to figure loan payments: present value, term, and interest. Since that's the way they must come inside the parentheses of the PMT() function, that's the order I created them.

The present value is simply the amount of money being borrowed. The term of the loan is how long it takes to pay it off. Since "eternity" is not an option, I chose a term of 60 months. I could've stated it in terms of years (5 years) or days, or any unit of time I wanted. I chose an interest rate for loan #1 of 12%.

Cell B5 is a formula cell which calculates the payment: =PMT(B2,B3,B4%/12). The first item in the parentheses (B2) corresponds to the loan amount. The second (B3) to the term. The third (B4%/12) to the interest. Notice that I divided the rate by 12 so that it would match my use of months as a time unit.

Once that column was done, I simply highlighted it from 2 to 5 with the mouse, selected "Copy" from the command menu, and clicked on row 2 of column D. Up to the command menu again, I selected "Paste" and that was that. Luckily, I had used relative references (B2, B3, and B4) in my formula, so what appeared in D5 was this: =PMT(D2,D3,D4%/12). See how handy relative references are. I did the same for column F.

The only other formula involved is at F8. It is a simple equation: =B5+D5-F5. Since it is contingent upon the formulas in those cells, every time you update any figure on the screen, they all must recalculate. This is handy. But it can also be slow. With a simple worksheet like this, though, speed was no problem at all.

The third loan here is merely a look at what would happen if I consolidated two outrageously high loans into a third. Nice little savings, eh? Why, with this much money left over each month, a person could . . . run up some more debt. Hey, why not. The economy is counting on us. We need to do our part.

Cell B5 is a formula cell:
=PMT (B2,B3,B4%/12)

Cell D5 and F5 are the same formula

Cell F2 is the sum of B2 + D2

	A	B	C	D	E	F	G
1		Loan #1		Loan #2		Consolidation	
2	Present value	15000		10000		25000	
3	Term	60		60		120	(doubled)
4	Interest rate	12		12		10	(lowered)
5		333.67		222.44		330.38	
6							
7						Savings	
8						225.73	

Wow! Enough left to buy lots more stuff!

Pssssssssst!

Good news! I just got several copies of new printer drivers. This issue of "Pumping GEOS" is printed on a Star SG-10 using Lasermatrix by Bill Prendergast (RD1, Box 11A, Conklin NY 13748). It takes awhile to print out, but this driver doesn't just darken the page, it interprets it. Check out the diagonal lines on this page. (Interesting footnote: you need to use a worn out ribbon. How's that for economy.)

Idea: When trying out printers and drivers one tends to waste a lot of paper (or does a lot of rewinding the platen). Try this: tear off about 12 sheets, feed it into the printer, and tape the two ends together to make a continuous loop. Then print away.

Bulletin: Timeworks has just released a wordprocessor for use with GEOS 64. It's called Writer 64 and my first impression is not good. The scoop is that this is the exact same program that Spinnaker produced which has not met with favorable reviews. More on this one in an upcoming column.

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Products marked with * were not released at time ad was prepared. Please call for firm price and availability.

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by Mark Jordan

The Winds of Change

The 128 Mode is about to take a new direction. In the next few months, we'll be exploring the technical, the whimsical and a few things in between. If there's a topic you'd like to see covered, write to Mark in care of Commodore Magazine, 1200 Wilson Drive, West Chester, PA 19380.

Yesterday it snowed great big fat flakes. I looked out my window at an ever-whitening country scene. Then it all melted. Slush, mud and—what's this got to do with the Commodore 128?

Seasons change, so do writers. "Now is the winter of my discontent . . ." (Shakespeare, but I forget from what). At any rate, I have received some mail lately that makes me think maybe it's time for "The 128 Mode" to slide into a new season. There seems to be a yearning out there in Commodore 128-land for more journalism and fewer type-in programs.

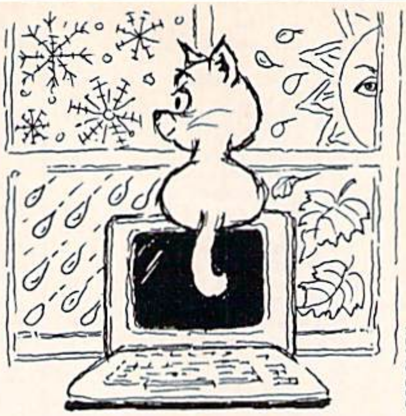
First, some facts about computer users. Most of them do three things when they buy their first computers. The first thing they do is to take it out of the box. (A very straightforward thing to do, I might add.)

The second thing they do is to run the demo program that came with the computer. This delights all in the family for about three minutes. That's when thing three—the last thing, the thing that lasts for as long as they have their computer—kicks in. They begin lusting for software.

Software, you may have noticed, costs money. Money, you may have noticed, does not print out convincingly on a dot matrix printer. (I have yet to get a dollar bill changer to take one—ha ha, just kidding there, Uncle Sam.) These two factors, driven by lust, are what cause folks to buy magazines and type in programs.

Old-timers among you may not type in many programs any more, but that doesn't mean there aren't a bunch of new users flowing into the computer arena daily. That's one reason I have been averaging about two type-in programs every three months of this column.

Another reason I have given you so many programs is that there is, as we all



BOB CLARK

know, not a lot of 128-specific software out there. While I have no delusions that my offerings are the commercial-quality stuff that everyone is clamoring for, they are niche-fillers.

I guess the biggest reason I have been so apt to put programs into this column is that I just plain-old love writing "shortware" (my term). I feel like a writer who prefers short stories to novels. It's fun.

Which brings us back to snow, slush and change. For the next three or four or more months, the column will be less program-oriented. Instead we'll be spending time doing several things: 1) exploring some of the more technical caverns within the 128 like the VDC, the REU and the "hidden RAM" in the 128D; 2) exploring some of the more whimsical areas in 128-land (you're going to help); and 3) whatever else comes to mind.

But there will still be some typing to do for those who want it. I will be creating short (less than a page) routines, demos and other things. In fact, this article has one such routine hidden in it. See if you can find it.

After four months (or more if you live in northern Indiana), spring comes. Then the poets rush into the fields full of wonder and stupidity, stepping happily and unwittingly in decaying cow dung. And after four months, I will take stock and determine the direction for the next season or two of "The 128 Mode." Want to help me? Then write. One letter from you represents about 10,000 from people who don't write. So write to me in care of *Commodore Magazine*, and become part of the forces of change. That way, if we step in dung, we step in together.

Cracklings

This month we're going to do number three above: whatever comes to mind. It seems around Christmastime, the computer world always crackles with activity. Here are the things that have crackled my way:

One topic that netted me several letters had to do with my discussion of the Commodore 128D. It seems some D-model owners have had problems. One writer said if I could assure him that mine worked with the Warpspeed cartridge, maybe he wouldn't give up on his D. Mine works. In fact, I have had no problems whatsoever with my 128D. This is not to say that I haven't heard of others who have experienced drive problems, because I have. But my machine has been a joy.

Well, wait a minute. I did experience one small let's-call-it-a-quirk. I have a utility program I use (I'll tell you about it in a minute) that resides in the free memory starting at 4864. I cannot get it to work with Warpspeed, at least not completely properly. As soon as I SYS to 4864, I get I/O errors when I try to type anything. This is unfortunate because it is a marvel, one I use constantly.

I came up with a semi-solution: as soon as I turn the computer on I type SYS 16384. This is a reset routine, BASIC's cold start. After doing that I can then load and SYS 4864 and my utility works perfectly. Why it works, I cannot tell. But there's a price to be paid: my Warpspeed utilities don't function any more. The fast saves and loads do function, so I'm happy. I recommend that any users who have been having problems with Warpspeed try this before giving up on your software.

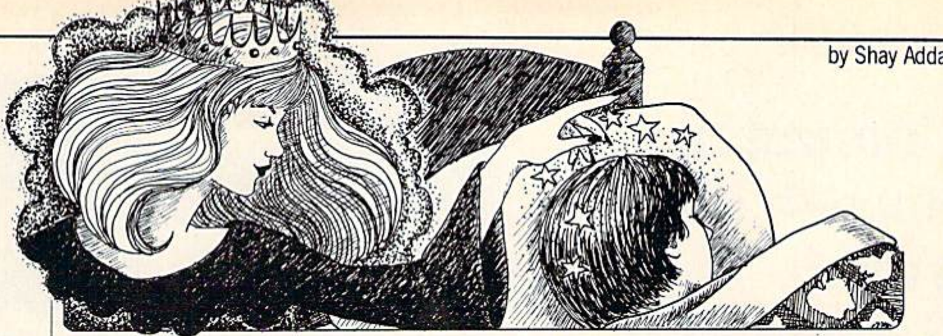
A Nifty Utility

About that utility. It's a little gem I got from *Transactor* magazine, Volume 7, Issue 5. The name given to the program is C128 Progaid, and it was written by Joseph Caffrey. It lets you 1) scroll your BASIC program in memory up and down the screen, both in 40 and 80 columns, 2) find any and all the variables and text in the program, and 3) change any and all variables and text in the program. And it does all three things fast.

My favorite capability is the one where I can type @ GET "variable" and if that variable exists, I'll see it in as many lines as it exists in. By opening a channel to the printer, I can easily dump this information to the printer. One reason I like this feature so much is that I write so many programs (sometimes I have several brewing at a time) I often forget what variable names I've used. With this utility, I can check.

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by Shay Addams



DENISE FALESKI VITOLLO

When is a Sequel Not a Sequel?

News and opinion from a leading explorer of those fantasy realms called adventure games.

Just because an adventure looks and plays like an earlier one by the same authors doesn't mean it's a sequel. It might be a "follow-up," which means the designer employed basically the same interface and presentation style of a previous title but did not link its plot to the story line of the first game. *Ultima V* is a sequel, not because it takes place in the same fantasy land and uses the same game system, but because the plot evolves from your discovery of the Codex in *Ultima IV.* (Most sequels that are role-playing games also allow you to import characters from earlier games in the series.) *Demon's Winter* and *The Legend of Blacksilver,* however, are follow-ups: neither lets you use existing characters, and their plots are unconnected to other fantasy titles by the same authors.

Demon's Winter could easily be mistaken for *Shard of Spring II*, since it was written by the same people (Craig Roth and David Stark) and looks and plays much like *Shard.* Your team consists of five members, the magic system is essentially intact, and a look at the graphics and presentation style reveals nothing new. What is new is a world that's 20 times bigger (though the quest does begin on the continent of Ymros, as it did in *Shard.*) That's one aspect that makes your mission to defeat the Evil God-Demon Malifon—the long-range goal, which unfolds gradually as you complete one mini-quest after another—a much more demanding challenge than completing *Shard.* At the same time, it's better balanced than *Shard:* you get more experience points for slaying monsters this time, so it's easier to advance through the ranks.

Other new aspects include a day–night cycle and special "dungeon items" that differ from ordinary things such as weapons and treasure that are also found in the dungeons. Dungeon items don't vanish into the void if dropped, and they cannot be sold. Their main use lies in puzzle solving, for such an object can be used only in conjunction with another dungeon item, perhaps by combining two parts of a key so you can unlock a door. Accordingly, you'll find more puzzles here than in *Shard.*

Combat will be familiar to fans of the *Wizard's Crown* games as well as to those who played *Shard.* When a battle breaks out, the aerial view of the landscape is replaced with a close-up view of your party members as they face individual opponents in an area whose terrain corresponds to that of the vicinity in which the encounter was initiated on the main map. (The outdoors and dungeon maps are shown from a top-down view that makes them fairly easy to map.) Your character with the highest Speed can attack, move and so on until he has used up all his Movement points for that turn. Combat options include turn, move, attack, invoke a magic item, and draw upon a special skill such as spellcasting or praying. Some battles occur while you're at sea but are limited to firing the ship's cannons.

The novel "Rune Magic" spellcasting system is composed of Ice Runes, Fire Runes and similar sets of spells that permit you to decide how many points of energy a Mage or Cleric puts into a spell. A ten-point Ice spell does far more damage than if you allocated one point. This enables you to cast your spells more efficiently and effectively (especially if you use the Monster Lore spell to learn the current enemy's Speed, Strength and Skill). Even novices will find combat and magic easy to learn and conduct, but the most experienced orc-slayer may have nightmares trying to assemble an effective crew at the outset. (The extensive manual has plenty of related information, but you'll have to study it like a schoolbook to profit from it.) The price is under $30—a bargain these days, but this one is definitely not for novices.

The Legend of Blacksilver

If you saw *Questron II* or *Legacy of the Ancients*, you already know what this one-character role-playing game looks and plays like: superbly detailed and animated graphics displayed in first-person perspective while you're in a dungeon, an overhead view of the outdoors, excellent sound effects, and scores of mini-arcade games to play while fulfilling one quest after another. The plot, laid bare in the manual, is unrelated to either previous game, both by Charles and John Dougherty. In the land of Thalen, Baron Taragas has rediscovered a substance called Blacksilver in the mines of a nearby island, Maelbane. A source of evil power, Blacksilver was instrumental in Thalen's conquest by evil wizards long ago. Thalen eventually prevailed, but only because Maelbane's source of Blacksilver dried up. Now that Taragas has hit a new vein of ore, Thalen again faces a threat from the east.

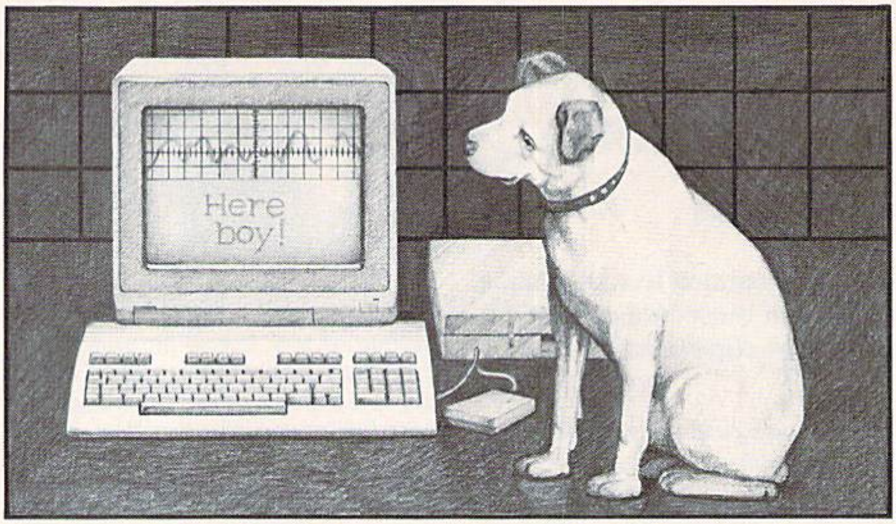
In the opening scene, Princess Aylea appears in your dreams and tells you her father was kidnapped by the enemy before he could launch a preemptive strike on Baron Taragas, then she chooses you as her champion. So out you go, looking for food, gold and a good time beating up on the Baron. Few changes have been made to the game system. The joystick/menu interface introduced in *Questron* could hardly be improved on, and it's hard to imagine sharper graphics on the 64. Several nuances give this fantasy world a unique flavor. In addition to slaying monsters or snaring gold from mazes, you can actually make your money the old-fashioned way—by earning it. Many shopkeepers will offer you a chance to work for a day. In one, I made ten gold coins by assembling brooms, which took a day of game time but only a split-second of real-time.

The arcade games are simple, yet entertaining diversions. Some let you gamble, in hopes of winning more money, while others reward you with character-building points. As in *Questron II* and *Legacy,* wall displays or windows open up and permit access to other areas. Nine simple spells comprise the magic system, and these are purchased in shops rather than learned in Guilds. An automatic resurrection feature makes dying nearly painless, and you get

Continued on page 71

by Jeff Spira

Computer Speech and Voice Recognition



MIA BOSNA

We all laughed in *Star Trek IV* when Scotty, after addressing the Mac computer both to its screen and to its mouse, declared, "Oh, the keyboard, how quaint." Well, we shouldn't laugh too loudly because it's entirely possible that we'll be addressing computers with our voices before too much longer. Gone will be the days when we could quietly work through the night with only the pitter patter of little keys to disturb the sleepers in our homes. ***[Editor's note:*** *It may be sooner than you think; see John Iovine's Voice-Controlled Joystick project on page 48.]*

It makes real sense to talk to a computer rather than punching out commands on a keyboard. Most people, myself included, can speak far more rapidly than they can type. Imagine the time saved by entering even a relatively small database by simply reading the data rather than keying it in. Modern computers work so rapidly that far more time is spent on inputting and outputting data than on actual processing time.

Speech recognition has other advantages besides speed. For instance, editors and writing critics are always harping on writers to write more like they talk. If they could talk to their computers and have their word processing programs instantly transcribe their words to ASCII files, they would be writing exactly like they talk.

Imagine being a programmer, sprawling out on a comfortable couch, and simply speaking out the code as you concentrate on the program at hand. It sounds far more productive than perching on a sometimes uncomfortable chair and staring at the monitor while trying to concentrate on the algorithm and typing accuracy simultaneously.

That day is not too far off. One currently available speech recognition board has a vocabulary of 400 words. To use the board it must first be taught the vocabulary. To teach it, the word must be spoken and the appropriate definition typed in. For instance, you could speak the phrase "delete line" and type in CTRL/Y. Every time thereafter when you said "delete line," the computer would execute a CTRL/Y function. Whether the program would execute a CTRL/Y function if someone walked up behind you and said "delete line" would depend upon the similarity of their voice to yours. If, for instance, you have a deep voice with a New York accent and your secretary has a soft, feminine southern drawl, chances are pretty good that the computer won't recognize the speaker who did not train it.

This type of board, though, may make the ideal programmer's tool. Few computer languages actually have more than several dozen words and a handful of operands. Sticking to single-letter tags and variables a programmer could write in BASIC, FORTRAN, Pascal or C by merely speaking. Later he'd have to go back and add comments and screen text on the keyboard.

Looking ahead, the boards will soon have bigger vocabularies, operate faster, and begin to recognize different individuals voices. Using an individual voice recognition, security access codes could be greatly simplified, though a tape recorder could suffice.

The only thing slowing down the advance of this technology is processor speed and available RAM. Well, if history has taught us anything, it's that processor speed and available RAM will increase at an ever-accelerating rate. Compare an 8K Commodore PET with todays 9 MB Amiga. That hasn't been over very many years, either. The experts tell us that computer capabilities are doubling every two years. This means that computers with a Norton SI rating (speed compared to a PC at 4.77 Mhz) of 50 and 20 MB of RAM will be around by Christmas 1991!

The fact that we'll soon be querying our databases and typing our letters via speech is assured. The only question is when. Certainly within five years a full dictionary will be available for speech recognition cards, much like spell-checking dictionaries are available for word processors today. Most letters and documents will be generated vocally rather than by punching keys.

One of the biggest difficulties we face with both speech recognition and voice synthesis on computers is the incredible complexity of the English language. How, for instance, can the computer know the difference between *red*, the color, and *read*, past tense of read. Speaking of which, how will it know whether to pronounce *read* as "reed" or "red"? Those subtle differences are readily interpreted and defined by the human brain, but can it be done effectively and rapidly on a microprocessor? Again, it is all processor speed and available RAM intensive.

Contrast the many hundreds of thousands of words vocabulary with a very inconsistent and confusing spelling system of English with the simplicity of Japanese. Japanese has fewer than 30,000 words made up of only 52 syllables. Each syllable has a unique symbol in the phonetic hiragana and katakana writing styles. This means that a computer could speak and understand the complete Japanese language with a vocabulary of only 52 sounds! Not only that, but it would never misspell a word. Written Japanese also does not contain punctuation, which simplifies matters even more for the Japanese.

For this reason, along with the Japanese penchant for high tech products, fully functional voice-operated computer sys-

tems will likely appear in Japan before the U.S. Such devices as automated bank tellers, computerized vending devices and other common computerized commercial devices will be gracing the streets of Tokyo and Osaka before they arrive in Los Angeles and New York.

The imagination can run wild with the possibilities of fully automated systems using voice-recognition systems. Imagine the grocery store of the future: You speak your bank access code then tell the computer what you want: "a box of Cheerios, a pound of coffee, a dozen eggs. . ." The store may have no employees on duty at all. Robotic systems would pick the items, load them into bags and deliver them to the buyer on a conveyor.

This is not a science fiction dream. Most of the technology exists now. We have bank card-controlled gasoline dispensers, automated warehouse part picking systems, and speech recognition boards. Even the cash registers in some of the new grocery stores call out the prices in a slightly metallic computer-generated woman's voice as the products pass the laser bar code readers, so the computer can talk back to you.

Voice synthesis is nothing new for computers. We've all heard computer voices when calling directory assistance or when travelling around some airports. Early speech synthesizers had a strange robotic voice that could pronounce only one letter at a time, so the voice often produced comedic sounds in response to text. The answer was to try to spell out the English words phonetically to get the synthesizer to sound correct. I recall trying to get an Apple voice synthesizer to say "souffle and scallops." I ended up spelling it *sooflay* and *skalups* to finally get it to pronounce the words correctly.

The voice synthesizers of tomorrow will have to pronounce each word as it reads it rather than each letter. This requires huge dictionaries of English. It will also have to check the context of the sentence for the correct phonetics of words that are spelled the same. This is a massive database that must be accessed very quickly. Again, lots of storage and lots of fast RAM are required.

From the rumors on the streets, soon we'll be seeing read/write optical disks (laser CD's) with massive storage capabilities. Clock speeds are going through the roof, too. All of these things will be required for efficient speech recognition and voice synthesis. All we need to do is figure out how to get lots of cheap RAM. ■

Continued from page 69

a fold-out, color map showing the main features of the two continents. Those who enjoyed the previous games from the Dougherty brothers can't go wrong with *Blacksilver*, which is also recommended for beginners.

More New and Imminent Releases

Computer games have always been a seasonal item, with many releases timed for the Christmas market. Now it's getting even more seasonal: I've seen more new games in the past month than in the rest of 1988 (this is being written on Pearl Harbor Day). Some new adventures and conversions to look for: *Faery Tale Adventure, Mars Saga, Might and Magic Book II* (all for Commodore 64), and for the Amiga, *King's Quest IV* (April or May), *Leisure Suit Larry II* (March), *Manhunter* (February), *Police Quest II* (March), *Space Quest III* (May or June), *Gold Rush* (April) and *The Twilight Zone*. *Star Flight* should take off for both systems by March or April of 1989.

Clues for the Clueless

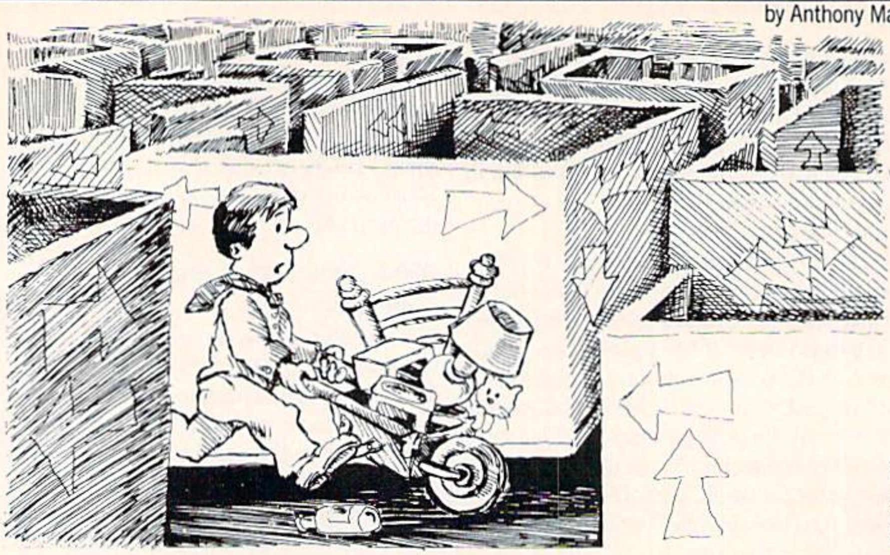
Legend of Blacksilver: You can make lots of money by saving the game, then gambling all your money (up to 300 gold) on your first bet. If you lose, restore the saved game. When you win, of course, save and repeat. Just be sure you're heavily armored and know the way out of town, for the guards will attack if you get too lucky and break the bank.

Demon's Winter: Get the Efnpo's Dsztubm by the Month of the Comet, or you'll be killed every time you try to sleep anywhere but a town. It's in the ruined Ice Temple of the Ancients, north of the epvhiovu-tibqfe jtmboe (in the northwest part of the world). To the east of it, you'll find the Ice Cave's entrance; inside is an Icecycle, needed in the ruined Ice Temple and the College of Ice Runes. Some mostly or wholly useless skills: View Items, Potion Lore, Item Lore. Cheapest ships are near the area where the game starts. It costs a lot of gold, but you can have items enchanted in the Dwarven Cave, found in the middle of Kudzu on the southernmost portion of a grass strip of land. The Dwarven Cave is a maze of corridors with lots of traps that should be mapped to find the Dwarven Forge, in the opsuifbtu part. The Kudzu, reached by ship, is xftu and opsui of your starting point in the game. (To decode these clues, which were provided by *QuestBusters'* Paul Nygard and others, count one letter back.) ■

by Anthony Maro

Lifeboat

for the Commodore 64



BOB CLARK

Being the rich and successful businessperson that you are, you think that it is about time for a vacation; you call upon your vast resources and rent a luxury starliner to take a slow cruise to the outer fringes of the quadrant. Your surroundings are elegant and the ride is smooth and uneventful . . . for most of the trip. On the third day out, you wake up to the sounds of explosions! It seems possible that your ever-present enemies have finally caught up to you. Now begins your journey into the unknown.

Lifeboat is a miniature interactive fiction adventure game which uses a verb-noun combination command structure. Due to the small size of the program, the command structure is limited. All commands must be one or two words—either a verb or a verb and a noun.

Movement from one room to another is achieved by entering "GO" and then the direction, such as "GO NORTH." This can also be abbreviated as the first letter of the direction you wish to go in. Movement abbreviations are: N, S, W, U, D. Sometimes movement is restricted and a visible exit is inaccessible.

The first time you enter a room the description is always displayed. The next time you enter that room only the name will be shown. To review a room description type "LOOK" or just "L."

Several items are included in the setting. Many of these can be picked up and carried around to other rooms or used in some way. For example, to pick up a box just type "GET BOX." If the item has a longer name such as "OIL CAN," then you should use only the second word as in "TAKE CAN." Dropping objects is done in the same way using "DROP" or "LEAVE," interchangeably. A list of what is being carried may also be viewed by typing "INVENTORY" or just "I" for short. All items that you carry will be listed.

Because this game imposes a time limit on you, it is possible to find out how many moves have passed. Entering "TIME" does just that, but be careful, it uses up a move.

I added an extra standard command to this game. Typing "HELP" will give you some type of response. Whether or not it is helpful depends on where you type it.

Memory limitations required that I put only a few rooms and a very limited vocabulary. I do not believe that this takes away from the enjoyment of the game in any way. Feel free to expand on this as you will.

Hints

If you are really having problems, the following clues might give some help. To decode the clues change each letter to the letter before it in alphabetical order. (Example: "DIBOHF" becomes "CHANGE")

- NPWF UIF CFE
- HP UP UIF DPNQVUFS SPPN BOE FOUFS "UZQF TPNFUIJOH"
- DSPXCBST IFMQ
- HPPE MVDL!

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Lifeboat

```
10 PRINT CHR$(147);CHR$(14);CHR$(30)
   :POKE 53280,0:POKE 53281,0'GGAH
20 NR=11:NV=33:NN=6:NO=6:RM=1:M=0
   :V4=100'HFHK
30 DIM MP(NR,7),VB$(NV),NN$(NN),
   NO$(NO,1),RN$(NR),OP(NO)'BYEK
40 FOR I=1 TO NV:READ VB$(I):NEXT
   :FOR I=1 TO NN:READ NN$(I)
   :NEXT'KAWL
50 FOR I=1 TO NR:FOR J=1 TO 6
   :READ MP(I,J):NEXT:READ RN$(I)
   :NEXT'KAIM
60 FOR I=1 TO NO:READ OB$(I,0),OB$(I,
   1),OP(I):NEXT'FEHL
70 MP(1,7)=1:PRINT"[SHFT H,SHFT E,
   SHFT L,SHFT P] IS AVAILABLE."
   :GOTO 640'DNNO
80 IF(INT(RND(1)*100)+1<10)OR M=0
   THEN A$="[SHFT Y]PV GFBQ
   FWOKPTJPMT!":GOSUB 880'LVRV
90 IF M>60 THEN 1750'DHXI
100 IF RM=10 AND OP(3)=0 THEN
    1660'FOAB
110 IF RM=10 AND V2=1 THEN 1700'FLWB
120 IF V4<M THEN PRINT"[SHFT T]
    HE LIFEBOAT HAS LAUNCHED WITHOUT
    YOU!":GOTO 800'FHLM
130 IF V5=1 THEN PRINT V4-M+1"MOVES
    TO LAUNCH."'GHYH
140 A1=0:INPUT"[DOWN,SHFT W]HAT NOW";
    AM$:PRINT:IF LEN(AM$)>20 THEN
    80'HTUK
150 FOR I=1 TO LEN(AM$)
    :IF MID$(AM$,I,1)<>" "THEN NEXT
    :W1$=AM$:W2$="":GOTO 170'NHBP
160 W1$=LEFT$(AM$,I-1):W2$=MID$(AM$,
    I+1,15)'GBSK
170 FOR I=1 TO NV'DETE
175 IF VB$(I)<>LEFT$(W1$,3)THEN NEXT
    :PRINT"[SHFT I] DON'T KNOW "W1$
```

```
    :GOTO 80'IUKU
180 W1=I:IF W2$=""THEN W2=0
    :GOTO 220'GOQK
190 FOR I=1 TO NN:IF NN$(I)=LEFT$(W2$,
    3)THEN W2=I:GOTO 220'JAAP
200 NEXT:FOR I=1 TO NO:IF LEFT$(W2$,
    3)=OB$(I,1)THEN W2=I:A1=1
    :GOTO 220'LHDK
210 NEXT:W2=100'CGKY
220 M=M+1:IF W1=1 THEN PRINT M"MOVES."
    :PRINT:GOTO 80'IMJH
230 IF W1<12 THEN 360'DHEC
240 IF W1<14 THEN 560'DHID
250 IF W1<16 THEN 610'DHGE
260 IF W1<19 THEN 640'DHMF
270 IF W1<24 THEN 690'DHNG
280 IF W1<26 THEN 730'DHKH
290 IF W1<28 THEN 760'DHPI
300 IF W1<30 THEN 800'DHDA
310 IF W1<32 THEN 920'DHIB
320 IF W1=32 AND W2$="SOMETHING"AND
    RM=7 THEN 1580'HOEJ
330 IF W1=32 AND W2$="SOMETHING"THEN
    A$="[SHFT N]P LFZAPBQC!":GOSUB 880
    :GOTO 80'IQAO
340 IF W1=33 THEN PRINT"TYPE
    SOMETHING":IF RM=7 THEN
    PRINT"HERE!"'IISN
350 IF W1=33 THEN 80'DGHF
360 IF RM=4 AND(W1=3 OR W2=2)AND V1=0
    THEN 390'JRTM
370 IF RM=6 AND(W1=2 OR W2=1)AND V1=0
    THEN 390'JRTN
380 GOTO 400'BDDG
390 A$="[SHFT C]BQHP JT MPS
    OQFTTVQJYFC.":GOSUB 880
    :GOTO 80'DJQR
400 IF W1>8 AND W2$="HATCH"AND(RM=3
    OR RM=7)THEN PRINT"[SHFT I]
    T'S LOCKED!":GOTO 80'LRYO
410 IF W1>8 AND W2$="HATCH"THEN
    PRINT"[SHFT W]HAT HATCH?"
    :GOTO 80'HJCK
420 IF W1<8 OR(W1>7 AND W2<7)THEN
    440'HOHH
430 PRINT"[SHFT D]O WHAT?"
    :GOTO 80'CDMF
440 IF W1<8 THEN W2=W1-1'FIRH
450 IF MP(RM,W2)>0 THEN 500'DNIH
460 IF MP(RM,W2)<0 THEN PRINT"[SHFT T]
    HE DOOR IS LOCKED!":GOTO 80'FNQP
470 IF W2<5 THEN PRINT"[SHFT S]
    OMETHING SOLID HITS YOU IN THE
    FACE!":GOTO 80'FGCT
480 IF W2=5 THEN PRINT"[SHFT Y]
    OU CAN'T CLIMB AIR!":GOTO 80'FGEQ
490 PRINT"[SHFT Y]OU FALL ON YOUR
    FACE.":GOTO 80'CDBP
500 RM=MP(RM,W2):PRINT:PRINT"[RVS]
    "RN$(RM):IF MP(RM,7)=1 THEN GOSUB
    840:GOTO 80'ILUM
510 MP(RM,7)=1'BJKC
520 DE=0:ON RM GOSUB 1160,1200,1280,
    1240,1320,1350,1380,1430,1470,
    1510,1540'DKHO
530 GOSUB 840'BDPD
540 IF DE=1 THEN 800'DGDG
550 GOTO 80'BCPE
560 IF W2=2 THEN A1=0'EGRI
570 IF W2=1 THEN A1=0'EGQJ
580 IF A1=0 THEN PRINT"[SHFT Y]
    OU CAN'T TAKE THAT.":GOTO 80'FGJR
590 IF OP(W2)<>RM THEN PRINT"[SHFT Y]
    OU DON'T SEE IT.":GOTO 80'GLVT
600 OP(W2)=0:PRINT CHR$(ASC(LEFT$(W2$,
    1))+32);MID$(W2$,2,10);
    " TAKEN."'HIBN
605 GOTO 80'BCPF
610 IF A1=0 OR OP(W2)<>0 THEN PRINT"
    [SHFT Y]OU DON'T HAVE IT."
    :GOTO 80'INLO
620 OP(W2)=RM:PRINT CHR$(ASC(LEFT$
    (W2$,1))+32);MID$(W2$,2,10);
    " DROPPED."'HJNQ
630 GOTO 80'BCPD
640 IF W2=5 AND RM=1 THEN PRINT"
    [SHFT T]HERE IS SOMETHING UNDER
    IT!":GOTO 80'HJVS
650 IF W1=18 AND W2=1 AND RM=5 AND
    OP(3)=11 THEN GOSUB 1800
    :GOTO 80'LYOR
660 IF W1=18 AND W2=1 AND RM=5 THEN
    PRINT"[SHFT I]T IS EMPTY."
    :GOTO 80'JNSS
670 IF W1=18 THEN PRINT"[SHFT Y]
    OU SEE NOTHING SPECIAL."
    :GOTO 80'FHXS
680 PRINT"[RVS]"RN$(RM):GOTO 520'CLJL
690 IF RM=1 AND W2=5 AND OP(6)=11
    THEN PRINT"[SHFT Y]OU FIND "OB$(6,
    0)".":OP(6)=1:GOTO 80'KGKA
700 IF W2=5 AND OP(6)<>11 THEN PRINT"
    [SHFT Y]OU ALREADY DID THAT!"
    :GOTO 80'INUP
710 IF RM<>1 AND W2=5 THEN PRINT"
    [SHFT D]ON'T SEE IT!":GOTO 80'IJKN
720 PRINT"[SHFT W]HY?":GOTO 80'CDBG
730 IF W1=24 AND RM=5 AND W2=1 AND
    OP(3)=11 AND OP(4)=0 THEN GOSUB
    1810'MCUS
740 IF V3=1 THEN GOSUB 880:V3=0
    :OP(3)=5:GOTO 530'HVPO
750 PRINT"[SHFT Y]OU CAN'T DO THAT."
    :GOTO 80'CDNM
760 IF OP(6)<>0 THEN PRINT"[SHFT Y]
    OU HAVE NO KEY.":GOTO 80'GJNR
770 IF RM>2 THEN PRINT"[SHFT T]
    HAT DOOR DOESN'T LOCK."'EDPR
780 IF W1=26 THEN MP(1,3)=-2
    :MP(2,4)=-1:PRINT"[SHFT O]K."
    :GOTO 80'JANV
790 MP(1,3)=2:MP(2,4)=1
    :PRINT"[SHFT O]K.":GOTO 80'EVVS
800 PRINT:PRINT"[SHFT B]
    ETTER LUCK NEXT TIME."'CBOJ
810 INPUT"[SHFT T]RY AGAIN[SPACE2]Y
    [LEFT3]";Y$'BDIJ
820 IF Y$="Y"THEN RUN'ECSH
```

```
830 PRINT"[CLEAR]":END'CBFG
840 AM=0:FOR I=1 TO NO:IF RM=OP(I)AND
    AM=0 THEN AM=1:PRINT"[SHFT Y]
    OU SEE ";'LYDV
850 IF RM=OP(I)THEN PRINT OB$(I,0)",
     ";'EQKN
860 NEXT:IF AM>0 THEN PRINT"[LEFT2]
    ."'FEVN
870 RETURN'BAQJ
880 FOR I=1 TO LEN(A$):A=1
    :B=ASC(MID$(A$,I,1))'IVPT
890 IF B<65 OR B>90 THEN PRINT
    CHR$(B);:NEXT I:PRINT:RETURN'KOHU
900 IF B/2=INT(B/2)THEN A=-1'IIAJ
910 PRINT CHR$(B+A);:NEXT I:PRINT
    :RETURN'GJJJ
920 PRINT"[SHFT Y]OU ARE CARRYING
    :"'BANK
930 AM=0:FOR I=1 TO NO:IF OP(I)=0
    THEN AM=1:PRINT OB$(I,0)'JCOS
940 NEXT:IF AM=0 THEN PRINT"[SHFT N,
    SHFT O,SHFT T,SHFT H,SHFT I,
    SHFT N,SHFT G]!"'FEGQ
950 GOTO 80'BCPI
960 DATA TIM,N,S,E,W,U,D,GO,ENT,WAL,
    RUN,TAK,GET,DRO,LEA,L,LOO,EXA'BGQY
970 DATA MOV,PUS,PUL,SHO,HIT,OPE,CLO,
    LOC,UNL,QUI,END,I,INV,TYP,HEL'BHUA
980 DATA NOR,SOU,EAS,WES,UP,DOW'BWFR
990 DATA 0,0,-2,0,0,0,"[SHFT Y]
    OUR CABIN"'BNVS
1000 DATA 4,6,0,-1,0,0,"[SHFT H]
     ALLWAY"'BNXX
1010 DATA 11,4,0,0,0,0,"[SHFT E]
     NGINE ROOM"'BNAA
1020 DATA 3,5,9,2,0,0,"[SHFT P]
     ASSAGEWAY"'BMKB
1030 DATA 4,6,0,0,0,0,"[SHFT C]
     ARGO"'BMPA
1040 DATA 5,7,9,2,0,0,"[SHFT P]
     ASSAGEWAY"'BMOD
1050 DATA 6,8,0,0,0,0,"[SHFT C]
     OMPUTER ROOM"'BMRF
1060 DATA 7,0,0,0,0,0,"[SHFT B]
     RIDGE"'BMDD
1070 DATA 4,6,10,0,0,0,"[SHFT L]
     IFEBOAT BAY"'BNDG
1080 DATA 9,9,9,9,0,0,"[SHFT L]
     IFEBOAT"'BMGG
1090 DATA 0,0,0,0,0,0,"[SHFT E]
     NGINES"'BMIH
1100 DATA"A LARGE CRATE",CRA,5'BGAY
1110 DATA"A HATCH IN THE FLOOR",HAT,
     3'BGEC
1120 DATA"A SMALL DEVICE",DEV,11'BHJB
1130 DATA"A BENT CROWBAR",CRO,8'BGNC
1140 DATA"A LARGE BED",BED,1'BGAC
1150 DATA"A KEYCARD",KEY,11'BHUD
1160 A$="[SHFT Y]PV TJS XJSGJM ZPVQ
     QPPN, DPMSFNOKBSJMH"
     :GOSUB 880'CGVO
1170 A$="XGBS SP CP MFWS.[SPACE2,
     SHFT T]GF CPPQXBZ JT JM SGF"
     :GOSUB 880'CGVO
1180 A$="FBTS XBKK, AVS SGF
     EVQMJTGJMHT BQF SPP"
     :GOSUB 880'CGHO
1190 A$="FMSJDJMH SP KFBUF.":GOSUB 880
     :RETURN'DHOL
1200 A$="[SHFT Y]PV TSBMC IVTS
     PVSTJCF ZPVQ FWOFMTJUF"
     :GOSUB 880'CGOI
1210 A$="DBAJM PM SGF KVWVQZ KJMFQ.
     [SPACE2,SHFT T]GF GBKKXBZ"
     :GOSUB 880'CGIJ
1220 A$="QVMT MPQSG-TPVSG XJSG ZPVQ
     DBAJM SP SGF":GOSUB 880'CGSK
1230 A$="XFTS.[SPACE2,SHFT S]
     JQFMT XBJK XJSGJM SGF TGJO."
     :GOSUB 880:RETURN'DHVL
1240 A$="[SHFT F]QPN GFQF JS JT
     OPTTJAKF SP HP MPQSG,"
     :GOSUB 880'CGAL
1250 A$="TPVSG, FBTS, PQ XFTS.[SPACE2,
     SHFT T]P SGF TPVSG JT"
     :GOSUB 880'CGBN
1260 A$="SGF DBQHP ABZ,
      XGJDG JT MPQNBKKZ MPS"
     :GOSUB 880'CGKN
1270 A$="OQFTTVQJYFC.":GOSUB 880
     :RETURN'DHYI
1280 A$="[SHFT T]GJT JT SGF NBTSFQ
     FMHJMF QPPN. [SHFT A]"
     :GOSUB 880'CGRP
1290 A$="TGQJKK TPVMC FDGPFT EQPN SGF
     MPQSGFQM":GOSUB 880'CGGQ
1300 A$="DQBXKXBZ.[SPACE2,SHFT A]
      QVTSFC CPPQ FWJST SP SGF"
     :GOSUB 880'CGTI
1310 A$="TPVSG.":GOSUB 880:RETURN'DHOC
1320 A$="[SHFT A]KK PE SGFTF DQBSFT
     DPMSBJM DBQHP SP AF"
     :GOSUB 880'CGCL
1330 A$="SBLFM SP ZPVQ CFTSJMBSJPM.
     [SPACE2,SHFT A] EFX NJHGS"
     :GOSUB 880'CGQM
1340 A$="DPMSBJM TOBQF OBQST.[SPACE2,
     SHFT D]PPQT KFBC MPQSG[SPACE2]
     BMC TPVSG."'BCSO
1345 GOSUB 880:RETURN'CETG
1350 A$="[SHFT O]MF PE SGF NBMZ
     OBTTBHFXBZT PM SGF"
     :GOSUB 880'CGDN
1360 A$="TGJO, EQPN GFQF JS JT
     OPTTJAKF SP HP":GOSUB 880'CGMO
1370 A$="MPQSG, TPVSG, FBTS,
      BMC XFTS.":GOSUB 880:RETURN'DHRN
1380 A$="[SHFT S]SQFXM BAPVS SGF
     EKPPQ PE SGJT DPNOVSFQ"
     :GOSUB 880'CGTR
1390 A$="QPPN BQF AQPLFM NFNPQZ
     DQZTSBKT,":GOSUB 880'CGOQ
1400 A$="BOOBQFMSKZ EQPN SGF TGJO'T
     NBJM":GOSUB 880'CGBI
1410 A$="DPNOVSFQ.[SPACE2,SHFT A]
      KPDLFC GBSDG JT JM SGF"
     :GOSUB 880'CGKK
1420 A$="EKPPQ, BMC FWJST BQF MPQSG
```

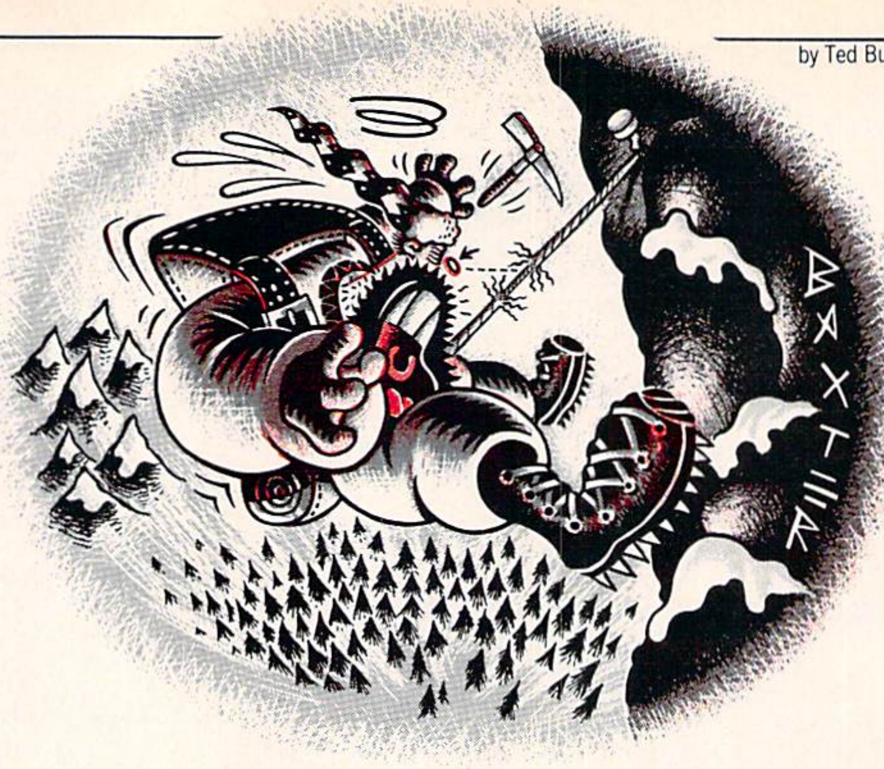
```
   BMC TPVSG.":GOSUB 880:RETURN'DHNM
1430 A$="[SHFT T]GF AQJCHF JT JM
   TGBNAKFT![SPACE2,SHFT S]
   PNFPMF GBT":GOSUB 880'CGSN
1440 A$="CFEJMBSFKZ TBAPSBHFC SGF
   TGJO.[SPACE2,SHFT A]QF"
   :GOSUB 880'CGVN
1450 A$="ZPV HFSSJMH XPQQJFC ZFS?
   [SPACE2,SHFT O]MF FWJS"
   :GOSUB 880'CGMO
1460 A$="KFBCT MPQSG.":GOSUB 880
   :RETURN'DHTJ
1470 A$="[SHFT T]XP PE SGF SGQFF
   KJEFAPBST BQF NJTTJMH;"
   :GOSUB 880'CGWR
1480 A$="SGF KBTS KJEFAPBS JT SP SGF
   FBTS.[SPACE2,SHFT T]XP"
   :GOSUB 880'CGOR
1490 A$="DVQUJMH OBTTBHFXBZT FWJS
   EQPN GFQF, PMF":GOSUB 880'CGFT
1500 A$="MPQSG BMC PMF TPVSG."
   :GOSUB 880:RETURN'DHGG
1510 A$="[SHFT T]GF KJEFAPBS JT B
   KJSSKF ABMHFC-VO.":GOSUB 880'CGWL
1520 A$="[SHFT S]PNF OBQST TFFN SP AF
   NJTTJMH.[SPACE2,SHFT I]S JT"
   :GOSUB 880'CGHN
1530 A$="BT JE ZPV BQF MPS XBMSFC SP
   KFBUF!":GOSUB 880:RETURN'DHJN
1540 A$="[SHFT W]GZ CJC ZPV CP SGBS?
   [SPACE2,SHFT W]BT JS MPS"
   :GOSUB 880'CGQN
1550 A$="PAUJPVT SGBS SGFTF BQF SGF
   FMHJMFT?":GOSUB 880'CGTP
1560 A$="[SHFT Y]PV GBUF DPMTFRVFMSKZ
   JMDFMFQBSFC":GOSUB 880'CGLQ
1570 A$="ZPVQTFKE.[SPACE2,SHFT A]
   QF ZPV GBOOZ MPX?":GOSUB 880
   :GOTO 800'DKUR
1580 PRINT"[SHFT T]HE SCREEN REPLIES
   :"'BANM
1590 A$="[SHFT E]MSFQ 1 SP OQFTTVQJYF
   DBQHP.":GOSUB 880'CGKR
1600 A$="[SHFT E]MSFQ 2 SP BDSJUBSF
   [SHFT L]JEF[SHFT B]PBS."
   :GOSUB 880'CGBK
1610 PRINT"[SHFT E]NTER YOUR CHOICE
   NOW-> [RVS] [RVOFF]"'BAWI
1615 POKE 198,0:WAIT 198,1:GET A$
   :A=VAL(A$)'FUVM
1620 IF A<1 OR A>2 THEN 80'FGVF
1630 PRINT"[SHFT O,SHFT K]."
   :IF A=1 THEN V1=1:GOTO 80'GJLJ
1640 IF OP(3)<>12 THEN PRINT"[SHFT N]
   ON FUNCTIONAL.":GOTO 80'GKDN
1650 V5=1:V2=1:V4=M+3:GOTO 80'FPVK
1660 OP(3)=12:A$="[SHFT T]
   GF TNBKK CFUJDF BOOBQFMSKZ EJST
   B GPKF":GOSUB 880'DOBU
1670 A$="JM SGF JMTSQVNFMS APBQC.
   [SPACE2,SHFT W]JSG DBQF ZPV"
   :GOSUB 880'CGWT
1680 A$="JMTFQS SGF CFUJDF.[SPACE2,
   SHFT T]GF KJEFAPBS GVNT"
   :GOSUB 880'CGPT
1690 A$="XJSG FMFQHZ.":GOSUB 880
   :GOTO 80'DJKP
1700 A$="[SHFT A]T ZPV FMSFQ,
   SGF KJEFAPBS TFBKT BMC"
   :GOSUB 880'CGPM
1710 A$="TKPXKZ KJEST BXBZ EQPN SGF
   TGJO.[SPACE2,SHFT Y]PV"
   :GOSUB 880'CGUO
1720 A$="GBUF NBCF HPPC ZPVQ FTDBOF."
   :GOSUB 880'CGBL
1730 A$="[SHFT C]PMHQBSVKBSJPMT EQPN
   [SHFT A]MSGPMZ [SHFT M]BQP,"
   :GOSUB 880'CGUQ
1740 A$="OQPHQBNNFQ.[SPACE2,SHFT K]
   FFO BCUFMSVQF HBNJMH!":GOSUB 880
   :PRINT:END'EIAS
1750 A$="[SHFT D]PM'S ZPV SGJML SGBS
   ZPV GBUF SBLFM":GOSUB 880'CGVR
1760 A$="KPMH FMPVHG?[SPACE2,SHFT T]
   GF TGJO GBT TVCCFMKZ"
   :GOSUB 880'CGHS
1770 A$="AQPLFM VO, FWOFKKJMH ZPV
   JMSP SGF":GOSUB 880'CGPS
1780 A$="UBDVVN PE TOBDF.[SPACE2,
   SHFT Y]PV GBUF CJFC.":GOSUB 880
   :GOTO 800'DKKU
1800 PRINT"[SHFT S]OMETHING IS IN
   THERE!":RETURN'CBEI
1810 A$="[SHFT Y]PV EJMC TPNFSGJMH!"
   :V3=1:RETURN'DHSL
```

END

by Ted Burch

Cliff-Hanger

for the Commodore 64



ART BAXTER

The Scenario

Congratulations! you have been chosen to represent your country in a climbing competition of unparalleled excitement and danger. Reaching the peak of Mount Bonecrusher will be a dangerous challenge even for someone with your impressive abilities. Making life worse is the famed Soviet country music singer/mountaineer Yuri Kychev who will be climbing on the opposite face of the mountain. Thus, even if you are skillful enough to avoid the boulders that come crashing down the unstable slopes, you will be embarrassed on an international scale if the Soviet makes it to the summit before you.

How to Play

All game play is joystick controlled. Moving the joystick in the appropriate direction results in the climber running left right or leaping into the air. Quickly tapping the fire button once causes the climber to fling his grappling hook upward. As the hook ascends, pressing the button a second time results in the grappling hook latching onto a ledge. Note that if the man is near the top of the playing screen, throwing the grappling hook causes it to "stick" on the top border so that the rope hangs free. Climbing is accomplished simply by positioning the man under the rope and pressing up on the joystick.

The two columns of boxes located in the upper-right corner of the screen indicate the total number of mountain levels that must be conquered before reaching the peak. Your current level is indicated by the number of darkened blue boxes in the rightmost column. Similarly, Yuri's level is shown on the adjacent column in red.

Remaining player lives are indicated by the stack of boxes in the upper-left corner of the screen. Lives may be depleted by being crushed by a boulder or falling too far from a cliff. Perhaps the most humiliating way to die is falling off the screen from an upper level of Mount Bonecrusher. Not only do you lose a life, but you must also start over from the base of the mountain on the first level. If all lives expire, press the joystick button to restart the game.

Upon reaching the summit, press the fire button a final time to plant your flag and win the game. However, don't expect this to be easy; success is earned in this game through patience and practice.

Playing Tips

Boulders will cause the most problems for the novice player. Try these tips for fewer casualties: Don't be afraid of falling a short distance to a lower ledge for a quick escape. Also, leaping over an oncoming boulder is possible, although this is not an easy task. The best strategy is to hide in a niche and allow the boulder to fall past, then climb like a madman to the next highest "safe" area.

Another tip is to note that once the rope is thrown, you are committed to a climb; running from a boulder is not possible while using the rope. Therefore, don't get squashed by a boulder while grappling or climbing.

Don't worry about Yuri pulling ahead of your climber. The basics of climbing and survival must be learned before winning the game is possible.

Modifications

If you find the game too easy or (more likely) too difficult, don't fret! Instead, change the variables described below in line 1350. Do not exceed the required range specified for each variable. Afterwards, you may want to save the new version under a new filename along with the original.

Opponent's speed: Set the variable MT (normally MT=200) to a larger number so that Yuri's ascent is slowed. Conversely, a smaller value for MT will cause your opponent to shoot up the slopes like a rocket. The values for MT can range between one and 65,535.

Number of levels: change HH from six to one for the smallest mountain. If you enjoy endurance climbing, set HH equal to a maximum of 16 for a frighteningly high mountain.

Boulder frequency: W1 controls how often boulders come crashing down from above. It must be set within a range of zero and 255, where the larger numbers cause boulders to fall more frequently. W1 is normally set to four.

Boulder speed: The boulder's descent speeds are dependent upon the variable W2. For the slowest speed, assign the value of one to W2 (this is also the normal game speed). Try the value of two for a greater boulder speed (which is barely playable).

Player lives: Lastly, the number of player lives is determined by ME (normally set to four). The maximum number of lives is 19.

Note to Programmers

Cliff-Hanger derives its speed from several sources. The most significant is the machine-language routine for boulder movement. Two important BASIC programming techniques are utilized for optimum speed. The first involves the separation of as many game tasks as possible. As a result, the program is never inside a giant loop with half a million IF statements. Instead, control is given to a number of smaller, independent loops, each of which

is not very large and is consequently very fast.

Setting all arbitrary numbers to variables increases program speed dramatically. Although most intermediate programmers realize this fact, some tend to omit small numbers under ten. Setting A=1 speeds up BASIC just as does setting A=1024. Admittedly, I do lapse into using numerical values instead of variables in several areas of the program. However, the critical loops for the action of the game use only variables. Also note that at times I mysteriously set variables equal to a period. This is a built-in function of Commodore BASIC and is known to be a fast method of clearing variables. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Cliff-Hanger

```
1010 PRINT"[CLEAR]";:POKE 53281,.
     :POKE 52,48:POKE 56,48
     :DIM M(38,2):DIM W$(17)'GLJF
1020 FOR Z=54272 TO 54296:POKE Z,.
     :NEXT:FOR Z=12544 TO 12551
     :POKE Z,.:NEXT'KIQI
1050 POKE 53272,(PEEK(53272)AND
     240)+12'EUBE
1055 FOR Z=12288 TO 12423:READ D
     :POKE Z,D:NEXT'GSQK
1080 FOR Z=49152 TO 49364:READ D
     :POKE Z,D:NEXT:POKE 54296,15'HCJL
1090 DATA 28,28,16,30,16,28,36,102,56,
     56,8,120'BLOJ
1095 DATA 8,56,36,102,28,28,73,62,8,
     20,20'BGXN
1110 DATA 54,8,0,8,0,8,0,8,0,0,
     126'BYNA
1115 DATA 66,66,66,66,66,126,28,42,73,
     8,8,8,8,8,8,8,8'BSQI
1150 DATA 8,8,73,42,28,0,32,64,128,
     255,128,64,32,0'BPGH
1155 DATA 52,126,47,182,247,90,62,15,
     3'BDOJ
1170 DATA 51,19,219,219,255,79,0,0,0,
     0,0'BFMH
1175 DATA 32,8,0,96,92,95,88,64,64,
     224,224,255'BLON
1190 DATA 255,255,255,255,255,255,
     255'BCGI
1195 DATA 102,102,102,102,102,126,60,
     0,60,110,112'BOMP
1201 DATA 60,14,118,60,0,60,60,102,
     126,126'BHEC
1205 DATA 102,102,0,124,126,102,124,
     124,110'BIMG
1210 FOR Z=0 TO 37:READ M(Z,0):NEXT
     :FOR Z=0 TO 27:READ M(Z,1):NEXT
     :U=53281'LHGJ
1220 FOR Z=0 TO 17:READ D
     :W$(Z)=CHR$(D):NEXT'HQWE
1225 J$="[L. GREEN]":AG=1:B=256:A6=833
     :A7=834'FXUL
1260 SL=1938:S1=1064:CR=54272:S2=1943
     :JX=56320'FLGM
1265 V1=15:V2=16:V3=40:V4=32
     :V5=11'FYHP
1280 V6=12:V7=1:V8=2:V9=3:VA=5:VB=6
     :VC=7:VD=10'IIKQ
1285 CF=21:A1=828:A2=829:A3=830
     :E=38'FBER
1290 A4=831:A5=832:AA=49329
     :XX=54283'ECUM
1295 LK=1504:A(0)=2:A(1)=2:A(2)=2
     :A(4)=1:A(5)=1'GLYU
1300 A(8)=0:A(9)=0:D(0)=0:D(1)=-40
     :D(2)=40'GGAG
1305 D(4)=-1:D(5)=-41:D(8)=1
     :D(9)=-39'HAPK
1330 AD=54291:SR=54292:HS=54287
     :LS=54286'EGWI
1335 WF=54290:NZ=129:PG=33:VE=135
     :WE=1262'FGWO
1340 REM*******MODIFY THESE VARIABLES
     :'BDAH
1350 MT=200:HH=6:W1=4:W2=1:ME=4'FVAJ
1450 REM*****************************
     *'BFWH
1455 MX=9:N1=PG:N2=VE:GOSUB 9000
     :YU=HH'FXHQ
1456 POKE A7,INT(MT/B):POKE A6,
     MT-INT(MT/B)*B'IUVS
1460 PRINT"[CLEAR,GRAY1]";:POKE XX,.
     :POKE U-V7,V8:POKE U,V8'FSKL
1480 FOR Z=1984 TO 2023:POKE Z+CR,V8
     :POKE Z,V6:NEXT'HWTO
1500 POKE U,14:FOR Z=0 TO HH
     :POKE WE+V7+Z*V3,4
     :POKE WE+V7+Z*V3+CR,V7:NEXT'OIRP
1505 IF DF THEN GOSUB 9900
     :GOTO 1520'ELPH
1510 FOR Z=HH TO HH-LV STEP-1
     :POKE WE+V7+Z*V3+CR,VB:NEXT'MWPM
1520 FOR Z=0 TO HH:POKE WE+Z*V3,4
     :POKE WE+Z*V3+CR,V7:NEXT'LYFN
1525 FOR Z=HH TO YU STEP-1
     :POKE WE+Z*V3+CR,V8:NEXT'KSDQ
1550 POKE A1,.:POKE A2,.:POKE A3,W1
     :POKE A5,W2:Z1=INT(RND(V7)*VA)
     +VD'JJVQ
1560 IF LV=HH THEN FOR Z=1 TO 10:PRINT
     :NEXT:AG=11:GOSUB 3160
     :GOTO 1570'LATQ
1565 PRINT W$(LV);:R$=J$
     :J$=W$(LV)'DVRP
1570 UU=INT(RND(1)*5)+V7+Z1
     :POKE A4,UU'HSIO
1590 FOR Z2=V7 TO UU:PRINT"L";
     :NEXT'FJBM
1595 PRINT:FOR Z2=1 TO Z1:PRINT"L";
     :NEXT:PRINT'HKTS
1600 FOR Z1=AG TO CF:IF LV<>HH THEN
     1605'HPOH
1602 R$="":PRINT"[GRAY1]";
     :IF Z1<21 THEN PRINT"[GRAY2]";
     'GKVI
1603 IF Z1<V2 THEN PRINT"[GRAY3]";
     'EFDG
1605 IF Z1=INT(CF/V9) THEN PRINT R$;
     'GLGK
1610 FOR Z2=V7 TO INT(RND(V7)*(Z1-8))
     +20:PRINT"L";:NEXT Z2:PRINT
```

```
     :NEXT Z1'MBTN
1650 FOR Z=V7 TO 35:PRINT"L";
     :NEXT'FIKJ
1655 IF LV=.THEN PRINT"LLLLL[UP,LEFT4,
     L. BLUE]L[UP,LEFT]L[LEFT,RED,
     RIGHT,DOWN]K[WHITE]K[BLUE]K";
     'EEDV
1660 IF DF=. THEN POKE SL,V7
     :POKE SL+CR,.'GPWM
1661 FOR Z=1024 TO 1944 STEP V3
     :POKE Z+CR,V8:POKE Z+V7+CR,V8
     :POKE Z+V7,V6'LJXV
1663 POKE Z,V6:NEXT:PRINT"[HOME,RED]L
     [DOWN,LEFT,CYAN]@[DOWN,LEFT]
     [DOWN,LEFT] [DOWN,LEFT] "'DGBP
1664 IF ME>.THEN GOSUB 9910'EHDN
1665 PRINT"[CYAN,HOME,DOWN3,LEFT2,UP]
     MM[DOWN,LEFT2]NN[DOWN,LEFT2]NO
     [DOWN,LEFT2]P [HOME]";
     :ON DF GOTO 2740,6030'DNHX
1690 JV=PEEK(JX):FR=JV AND V2
     :JV=V1-(JV AND V1)'HYUT
1694 SYS AA:IF PEEK(A2)=.THEN
     1730'FMNR
1695 IF PEEK(A2)<>V8 THEN 9800'FKWS
1697 GOSUB 5010'BEHQ
1730 IF PEEK(SL+V3)=V4 THEN 2740'FMGJ
1740 IF PEEK(SL+D(JV))<>V4 THEN
     1810'GPWL
1750 IF SL>S2 THEN 2720'DIJI
1760 IF JV THEN POKE SL,V4:SL=SL+D(JV)
     :POKE SL,A(JV):POKE SL+CR,.'IIHT
1770 IF FR THEN 1690'CGDJ
1780 IF TS THEN 3200'CGHK
1795 IF PEEK(SL-V3)=V4 AND
     PEEK(SL+V3)<>V4 THEN 1860'KUOA
1800 GOTO 1690'BENC
1810 TP=SL+D(JV):IF PEEK(TP)=V6 THEN
     JV=.:GOTO 1750'IYSN
1820 IF PEEK(TP)=V9 OR PEEK(TP)=VD
     THEN 2930'HQUL
1830 IF PEEK(TP-V7)=VC THEN N1=PG
     :N2=VE:GOSUB 9000:POKE TP-V7,V4
     :GOTO 1750'LKOT
1840 JV=.:GOTO 1750'CIQI
1860 IF SL<S1+V3 THEN POKE SL-V3,V9
     :POKE SL-V3+CR,V7:GOTO 2930'KDPU
1862 IF PEEK(SL-V8*V3)<>V4 THEN
     1690'HOQR
1865 HL=SL-V3*V8'DIHQ
1870 POKE SL+CR-V3,V7:POKE SL,V8
     :POKE HL+CR,V7:RY=.'HCXT
1900 GOSUB 2840:RY=RY+V7
     :IF PEEK(A2)=.THEN 1909'HVUL
1902 IF PEEK(A2)<>V8 THEN 9800'FKWJ
1904 GOSUB 5010'BEHH
1909 IF RY>MX THEN 1970'DIEP
1910 IF PEEK(HL)<>V4 THEN 1970'FKBI
1920 POKE HL,VA:POKE HL+V3,V9
     :POKE HL+CR,V7'FVHM
1925 IF HL<S1 THEN POKE HL,V9
     :GOTO 2930'FOPP
1940 IF FR=.AND PEEK(HL-V7)=V4 THEN
     2030'HPGO
1950 HL=HL-V3:GOTO 1900'DLEL
1970 HL=HL+V3'CGNM
1980 HL=HL+V3:GOSUB 2840
     :IF PEEK(A2)=.THEN 1990'HVUT
1982 IF PEEK(A2)<>V8 THEN 9800'FKWR
1984 GOSUB 5010'BEHP
1990 RY=RY-V7:IF RY=. THEN N1=PG:N2=VE
     :GOSUB 9000:POKE HL-V3,V4
     :GOTO 1690'LMTC
2000 POKE HL,VB:POKE HL-V3,V4
     :GOTO 1980'ESKA
2030 HL=HL-V7'CGSA
2040 GOSUB 2840:IF PEEK(A2)=.THEN
     2059'FOCD
2042 IF PEEK(A2)<>V8 THEN 9800'FKWF
2044 GOSUB 5010'BEHD
2059 IF PEEK(HL)=V6 THEN POKE SL,V7
     :N1=NZ:N2=V8:GOSUB 9000
     :GOTO 2930'JGBV
2060 POKE HL,VC:POKE HL+CR,V7
     :POKE HL+V7,VD'FVYI
2070 IF PEEK(HL-V3)<>V6 THEN POKE
     HL-V3,V4:POKE HL-V3+V7,V4'LABO
2080 HL=HL+V3:GOTO 2040'DLYG
2100 FOR Z=1 TO 120:NEXT:POKE WF,.
     :POKE LS-V9,.:POKE AD,V1
     :POKE LS-V8,V1'KHAI
2130 POKE AD+V7,240:POKE LS-V7,240
     :POKE AD-V7,17:POKE LS-V9,17
     :Z1=.'JMGM
2160 POKE HS,M(Z1,LF):POKE LS,M(Z1,LF)
     :POKE WF-VD,M(Z1,LF)/V8'FOAN
2190 POKE WF-V5,M(Z1,LF)/V8
     :Z1=Z1+V7'FWPM
2200 IF M(Z1,LF)<. THEN POKE WF,.
     :POKE LS-V9,.:RETURN'HVIF
2210 GOTO 2160'BEGX
2230 DATA 102,0,160,0,140,11,212,173,
     60'BEYE
2235 DATA 3,48,52,208,3,76,155,192,
     177,251,201,3'BNSL
2250 DATA 176,5,200,140,61,3,96,169,
     32,145,251'BLQI
2255 DATA 160,40,177,251,201,3,144,20,
     201'BGEM
2270 DATA 12,240,46,24,165,251,105,40,
     133'BGMJ
2275 DATA 251,165,252,105,0,133,252,
     76,63,192'BKRP
2290 DATA 200,140,61,3,96,160,0,169,8,
     145,251'BKJM
2295 DATA 165,252,24,105,212,133,252,
     169,9'BHCQ
2310 DATA 145,251,56,165,252,233,212,
     133,252'BJSF
2315 DATA 96,160,0,169,129,141,11,212,
     169,0'BIVJ
2350 DATA 141,12,212,169,241,141,13,
     212,169'BIOI
2355 DATA 1,141,8,212,141,7,212,169,
     32,145'BHNN
2370 DATA 251,160,1,177,251,201,3,144,
     190'BGOK
2375 DATA 24,165,251,105,1,133,251,
     165,252,105'BLFQ
```

```
2390 DATA 0,133,252,165,252,201,7,144,
     175,165'BKNN
2395 DATA 251,201,148,144,169,136,140,
     60,3'BHVR
2410 DATA 96,173,4,220,205,62,3,176,
     155,200'BIVF
2415 DATA 140,60,3,169,4,133,252,173,
     63,3,133'BKIL
2450 DATA 251,96,206,65,3,173,65,3,
     201,0,208'BJOK
2455 DATA 16,206,66,3,173,66,3,201,
     255,208,6'BJSP
2456 DATA 169,2,141,61,3,96,174,64,3,
     32,0,192'BKPQ
2457 DATA 202,208,250,96,100,50,200,
     100,50'BHXQ
2580 DATA 200,150,100,250,150,100,100,
     50,200'BJAN
2585 DATA 100,50,200,100,100,100,100,
     105,105'BJSS
2600 DATA 120,140,160,0,0,0,0,100,50,
     200,0,100'BLVH
2605 DATA 50,200,-1,190,180,170,160,
     190'BEIL
2640 DATA 180,170,160,190,180,170,160,
     150'BGSK
2645 DATA 140,130,120,60,60,60,40,40,
     40,0,0,20'BLQQ
2660 DATA 20,20,-1'BICH
2720 SL=SL-V3*23:LV=.:AG=V7
     :J$="[L. GREEN]"'GUEM
2730 DF=V7:GOTO 1460'CJLH
2740 F=.'BCMG
2750 IF PEEK(SL+V3)=V6 OR
     PEEK(SL+V3)=V5 THEN 2790'JUXQ
2770 F=F+V7:SL=SL+V3:POKE SL,V8
     :POKE SL+CR,.'HYFT
2775 IF PEEK(SL-V3)<>V6 THEN POKE
     SL-V3,V4'IPOW
2780 GOTO 2750'BELK
2790 IF F<VA THEN 1690'DHUN
2800 IF SL>S2 THEN 2720'DIJF
2810 POKE SL,VD-V7:N1=NZ:N2=V8
     :GOTO 9500'FWJL
2840 JV=PEEK(JX):FR=JV AND V2
     :JV=V1-(JV AND V1)
     :IF JV THEN POKE SL,A(JV)'KKFV
2850 SYS AA:RETURN'CDGI
2900 SL=1938:LV=LV+V7:GOTO 1460'ESBK
2930 JV=PEEK(JX):JV=V1-(JV AND V1)
     :POKE SL,A(JV):POKE SL+CR,.'IITT
2950 SYS AA:IF PEEK(A2)=.THEN
     2960'FMTN
2955 IF PEEK(A2)<>V8 THEN 9800'FKWS
2957 GOSUB 5010'BEHQ
2960 IF JV=V7 AND PEEK(SL+D(JV))=V9
     OR PEEK(SL+D(JV))=VD THEN
     SL=SL-V3'NHQB
2970 IF SL<S1 THEN 2900'DIKN
2980 IF PEEK(SL-V7)=VC THEN 3030'FMTR
2990 IF JV AND PEEK(SL+V3)<V6 THEN
     POKE SL+V3,V4'IRUV
3010 IF LV=HH AND SL<LK THEN
     TS=V7'GMWD
3020 GOTO 2930'BELX
3030 POKE SL,V4:IF PEEK(SL+V3)<>V6
     THEN POKE SL+V3,V4'JVAJ
3035 SL=SL-V3-V7:N1=PG:N2=VE
     :GOSUB 9000:GOTO 2740'HDHO
3110 GOSUB 2100'BEEX
3120 POKE SL+CR,M:M=M+V7
     :IF M>VC THEN M=.'IRSH
3130 IF PEEK(JX) AND V2 THEN 3120'EKCD
3140 RUN'BAMA
3160 POKE A1,B-V7:PRINT"[WHITE]";
     :RETURN'EJMG
3200 IF PEEK(SL+V7+V3)=V4 THEN
     1690'GOOE
3205 IF SL>1424 THEN TS=.
     :GOTO 1690'FOCI
3210 POKE SL+V7,V5:POKE SL+V7+CR,VB
     :POKE SL,V8:PRINT"[WHITE,HOME,
     DOWN5,RIGHT4]M N O[HOME]";'HANL
3225 SL=SL+V7:GOTO 3110'DLYI
4010 DATA 159,155,152,158,158,159,150,
     156,159'BKVE
4015 DATA 155,155,153,30,159,159,31,
     150,129'BIHI
5010 IF LV=HH THEN RETURN'EENB
5015 POKE A7,INT(MT/B):POKE A6,
     MT-INT(MT/B)*B:YU=YU-V7
     :POKE WE+YU*V3+CR,V8'OOKW
5030 N1=PG:N2=V6:GOSUB 9000
     :IF YU<V7 THEN 6005'GXQJ
5050 POKE A2,.:RETURN'CFSE
6005 POKE XX,.:FOR Z1=1 TO 20'EKHH
6010 FOR Z=HH TO YU STEP-1
     :POKE WE+Z*V3+CR,Z1
     :NEXT Z,Z1'KWRL
6020 DF=V8:TL=LV:LV=HH:GOTO 1460'ETNH
6030 PRINT"[DOWN9,RIGHT6,BLUE]B[RED]
     K"'BATD
6031 FOR Z=1 TO 25:POKE 1390,
     INT(RND(V7)*V8)'HSHK
6032 N1=PG:N2=VE:GOSUB 9000:NEXT
     :POKE 1390,V8'FXOL
6034 PRINT"[WHITE,HOME,DOWN5,RIGHT4]
     M N N P[HOME]";:LF=V7:SL=1391
     :GOTO 3110'ESFO
9000 POKE WF,.:POKE WF,N1:POKE AD,VE
     :POKE SR,.'EVWI
9005 POKE HS,N2:POKE LS,N2:RETURN'DMSK
9500 ME=ME-V7:POKE WE-E+CR,7'FONN
9510 POKE XX,.:GOSUB 9000:J$=R$
     :FOR Z=1 TO 250:NEXT'HVOP
9600 N1=NZ:FOR Z=200 TO 20 STEP-20
     :N2=Z:GOSUB 9000:POKE WE-E+CR,Z/4
     :NEXT'NHDX
9610 POKE WE-E+CR,14'DIRL
9620 IF ME=.THEN LF=V7:GOTO 3110'FMCO
9650 FOR Z=1 TO 2800:NEXT:SL=1938:DF=.
     :GOTO 1460'HXVV
9800 POKE SL,8:POKE SL+CR,9:N1=NZ
     :N2=V8:GOTO 9500'GBAT
9900 FOR Z=HH TO HH-TL STEP-1
     :POKE WE+V7+Z*V3+CR,VB:NEXT
     :RETURN'NXHY
9910 FOR Z=0 TO ME-V7:POKE WE-E+Z*V3,4
     :POKE WE-E+Z*V3+CR,1:NEXT
     :RETURN'PDOC
```

END

Continued from page 38

on the startup screen.

I also have a problem with the premise. To quote the package, "Extra-terrestrial pacifists have taken control of the economic, political, and social life on earth. War and violence are things of the past, and even the most basic games and sports are lacking in the action and aggression that unfortunately every earth inhabitant is lusting for."

Ugh. Not *this* earth inhabitant.

"Then the offshore warriors movement began. A sport evolved in which the participants pilot enormously powerful boats in a battle against their opponents and the elements."

Yeah, right. If these aliens are pacifists, why do they let people blow each other up while racing speedboats? Don't worry about the story line, you can probably make up a better one yourself.

Overall, *Offshore Warrior* has a good arcade-quality look and feel. The controls are simple: left, right, velocity up/down and fire, in true arcade style. It also grows on you. As play progresses, opponents become more numerous and more intelligent. It didn't take long to catch myself thinking, "Weeeell, just one more game and I'll call it quits," and half an hour later thinking "Weeell, just one more game." This game is definitely for the arcade aficionado. There's a very short learning curve, no keyboard functions except pause, no maps, no commands, only drop-in-your-quarter arcade action. If you like arcade racing games of the *Pole Position* and *Turbo* type, you'll definitely go for *Offshore Warrior*.

Blow 'Em Out of the Water

- I suggest staying at full speed throughout the race at lower levels, although at higher levels with a crowded field I can see where judicious application of the brakes could be useful. Don't collide with the stern of a competitor or allow them to ram you from behind, either way you'll lose (kaboom).
- You get unlimited lives, but they won't do much good unless you finish first or second.
- If you pass a boat, don't get in its lane immediately afterwards; you can't see it fire its missiles, but a boat you have just passed will probably get you.
- On the first two levels blow up the other boats, so there is only your boat and the leader's. That way you can experiment with tactics and get to the next level without getting the "game over" message. ■

Continued from page 68

The last feature, a search and replace option of sorts, is also very handy at times. The text inside PRINT or CHAR statements is often something I'll want to change globally. Also, it's a snap to change all the color in a program this way.

I'm sure a lot of you have utilities like these already. It isn't especially novel. The reason I like this one so much is that (here we go) I could type it in for free. It took me about an hour to type it in, and it was well worth my time. If you're looking for a utility such as this, write to *Transactor*, 500 Steeles Avenue, Milton, Ontario L9T 3P7.

The 1581 Disk Drive

I haven't had a great deal of time to test my new 1581 disk drive out yet, but I've got some first impressions.

It's fast. The word processor I use saves files sequentially without using any of the burst routines. It's always seemed fast enough for me, especially since I'm an old 1541 graduate. But now, with the 1581, it blazes. Here's a for-instance: this file as I presently type it is 111 lines long. I will now save it using my built-in 1571 disk drive. Here goes . . . 19.6 seconds.

Now with the 1581 . . . 10.7 seconds, an 83% increase in speed. The difference gets more dramatic as the file gets longer. I tested one the other day that took 29 seconds for the 1571 and only 12 for the 1581. That's about a 140% increase in speed.

It's been written many times, but the first thing that will surprise you about the 1581 is its size. It's a diminutive little guy. I don't know why, but small things are always cute. Small kittens, small raccoons, even small humans (if they belong to you). The 1581 is cute. I suppose in the future when data will be stored in ways too small to imagine presently, the 1581 will look like an old clunker. But this is 1989 and the 1581 is cute.

And fast.

My wife wondered, what are you going to do with a disk drive that none of your software fits? (Some people just don't understand.) Actually, it's a fair question: why should any 128 owner get a 1581? for me the answer is simple: GEOS. I write the "Pumping GEOS" column (see page 88), and I wanted the extra speed and storage capacity. I also had ideas about putting all my other disks into the 1581 format in an attempt to GET ORGANIZED. Of course, I didn't tell my wife that reason—she's seen how much computers "organized" my life already. (Sometimes, as she gazes across my sea of technology, she gets wistful about our back-to-the-land days. The mood passes quickly, however, when she runs her fingers across the touch-membrane numbers on the microwave.)

There is another good reason to own a 1581: the tough little disks. They'll hold over two 1571 disk's worth of data, and they don't have sleeves (no small benefit). And, best of all, you can leave them in a pile and even accidentally sit on them without ruining them. Try that with a 5.25-inch floppy.

I will report in-depth on the 1581 in a future column. But I have to include this little type-in now. If you have a 128D and occasionally want your 1581 drive to be your first drive (device 8) and the built-in drive to be your second (device 9), run this program every time you power up and you'll be able to do it.

```
10 OPEN 15, 8,15"U0>"
   +CHR$(10):CLOSE 15
20 OPEN 15, 9,15"U0>"
   +CHR$(8):CLOSE 15
30 OPEN 15,10,15"U0>"
   +CHR$(9):CLOSE 15
```

You will need to have your 1581 device switch set as device number 9 for this to work.

Your Turn

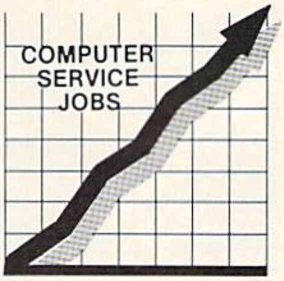
Okay, now I want your input. I told you about a little-known utility I use; you tell me about a favorite piece of 128 mode software you use. My one stipulation: only tell me about the non-famous ones. Magazine programs (both disk and paper), bulletin board downloads or user group specialties are the ones I want to hear about. And don't forget about that program that your neighbor Ralph wrote (as long as it works—which reminds me, that's another stipulation: it's got to work). If enough of you send me your favorites—and be sure to tell where you got them and how others can get them—I'll compile them and do a column on them.

By the way, don't be ashamed to include any of the type-in programs you've gotten from this column. I won't hold it against you.

Well, I'm finishing this article about five days after I started it. The weather warmed up to 60 degrees, and I got my lawn mowed one last time on Thanksgiving Day. My three kids were tricked into thinking spring was here. They raced into the field, happily and unwittingly, not noticing the . . . change of seasons. It was so cute. (Sorry, but a dumb beginning begets a dumb ending.) ■

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by Matthew Leeds

Sort of a Standard

Early in the development of the Amiga a remarkable thing occurred. Software developers (most prominently Electronic Arts) and Commodore developed a set of standards for data storage of graphic images, sound samples, musical scores and text. This set of standards is known as the Interchange File Format (IFF).

The original concept was that standards are good for software users. Standards allow software users to move data between independent applications without the need for file conversion utilities. Standards allow developers to concentrate on creating new and innovative software while still maintaining links to existing software programs. The original concept was proposed in a set of documents released in mid 1985, and while that concept is still a good idea, a lot has changed since then.

Amiga users have discovered that the standards do not always work. How many times have you tried to load a graphics image created by one application into another to find it doesn't work? Sometimes you are presented with a message claiming the file is corrupt, sometimes nothing happens, and sometimes you get a visit from the guru. Sometimes the file loads, but what appears on the screen bears little resemblance to the original image. Welcome to the non-standard standard.

Problems of this nature are not limited to graphics either. Transporting text files from one word processor to another on the Amiga now requires either saving the file as a simple text-only file or using a file conversion utility. Formatting information, soft styles and perhaps color (if supported) are either lost or ignored. Similar problems occur with music applications. Information on the instruments used in a score or scoring data itself is often mangled or simply not found as files are moved from application to application.

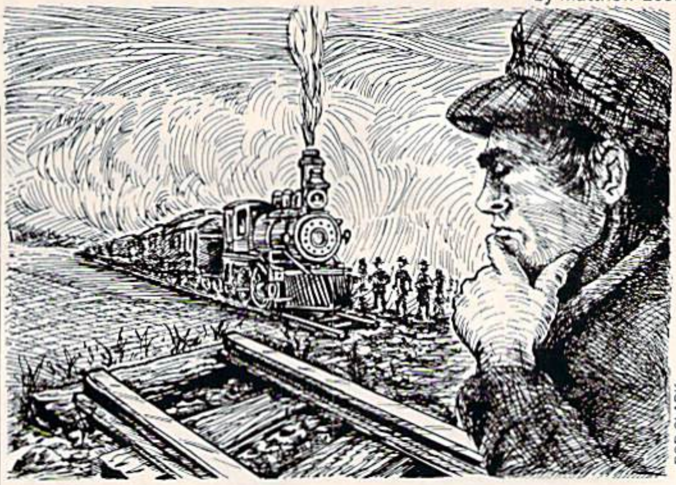
To understand why this occurs, and to perhaps discover some techniques for solving incompatibilities between applications let's take an in-depth look at the IFF standard for non-animated graphic images, the Interleaved Bitmap (ILBM).

The IFF ILBM standard uses two simple ideas to ensure compatibility across applications, separate each piece of data that could be ambiguous into its own uniquely-named packet and ignore all ambiguous or unknown packets. If all applications that either created (wrote) and/or used (read) ILBM followed this exactly then virtually no incompatibilities would exist.

Let's take a look at how an ILBM is constructed. By seeing how each packet is laid out and used, we can better understand where confusion may be created. In the IFF standard specifications, packets are called Chunks, and each different type of IFF file is a different Form. The ILBM is one type of IFF Form. I have dumped a typical ILBM file as a hex character file and included the first few lines to illustrate its construction. You can dump any IFF file and look at its layout using the same technique. To dump an ILBM (or any file for that matter) use the TYPE command like this:

```
C:TYPE > Path/DestinationFileName Path/SourceFileName
Hex
```

where SourceFileName is the ILBM you want to dump and DestinationFileName is the resultant Hex dump. Be sure to include all relevant path information for source and destination files. If you are working on a floppy-based system, be sure that you have sufficient empty space on your destination disk, as dumping an ILBM as Hex results in a file as much as four times larger than the original file. The HAM overscan file used as an example was 120,188 bytes in size and its Hex dump was 465,740 bytes.



BOB CLARK

Creating a standard is always a tradeoff between a multitude of factors such as speed, robustness, expandability and file size.

```
0000:  464F524D  0001D574  494C424D  424D4844  FORM...tILBMBMHD
0010:  00000014  016001E0  00000000  06000100  .....'..........
0020:  00000A0B  01400190  43414D47  00000004  .....°.CAMG.....
0030:  00000804  434D4150  00000030  000000F0  ....CMAP...0....
0040:  F0F01000  00302010  40303050  60408030  .....0 .°0P"0
0050:  30705040  80706080  8060C060  60A09080  0pP'p'..'.'...
0060:  90C080F0  9090D0B0  A0E0D0C0  424F4459  ............BODY
0070:  0001D508  2BFA607B  8A854720  95ADE7F5  .... + .'{..G ....
0080:  DFFF4BFF  5D5DDBB4  0002AA00  000ADE58  ..K.]].........X
```

This is what a raw Hex dump looks like. Below I've added some additional information for each line of the dump.

	FORM	length	ILBM	BMHD	start of bitmap chunk
0000:	464F524D	0001D574	494C424D	424D4844	FORM...tILBMBMHD
	length	WideHigh	XorgYorg	PlmkCoPd	Planes Mask Compression Pad
0010:	00000014	016001E0	00000000	06000100	.....'..........
	TranAspt	PagwPagh	CAMG	length	start of CAMiGa viewmode chunk
0020:	00000A0B	01400190	43414D47	00000004	.....@..CAMG....
	Viewmode	CMAP	length	rgbr	Viewmode 800 = HAM 4 = Lace
0030:	00000804	434D4150	00000030	000000F0	....CMAP...0....
	gbrg	brgb	rgbr	gbrg	rgb's are for reg0 thru reg15
0040:	F0F01000	00302010	40303050	60408030	.....0 .@00P'@.0
	brgb	rgbr	gbrg	brgb	
0050:	30705040	80706080	8060C060	60A09080	0pP@.p'..'."...
	rgbr	gbrg	brgb	BODY	start of BODY chunk
0060:	90C080F0	9090D0B0	A0E0D0C0	424F4459	............BODY
	length	start of	body data		Compression flag = 1
0070:	0001D508	2BFA607B	8A854720	95ADE7F5	.... + .'{..G ....
	more data				
0080:	DFFF4BFF	5D5DDBB4	0002AA00	000ADE58	..K.]].........X UjU

The first line of the dump declares that this is a FORM ILBM and gives its length. All Forms (and Chunks) have unique names (ID's). ID's are registered with Commodore, and in theory all programs that read IFF files should be able to parse any IFF file for FORMs and CHUNKs that it can use and ignore any that it finds that it cannot use. This is the first place that some

There are several ways to solve image file incompatibility. If you own a variety of programs that read and write image files, you might have found some problems already.

programs run into problems; when they encounter a chunk that they do not recognize, they give up. Also, all IFF files are of even byte length. All applications that write IFF files are supposed to pad files to an even length. If this is not done, the file is seen as not valid. Every chunk always defines its length just after its ID.

At the end of the first line is the beginning of the BitMap-Header (BMHD) chunk. By tradition this is always the first chunk in an ILBM, but this is not a part of the specification. Ideally, all IFF readers should be able to accept ILBM's that do not have the BMHD chunk as the first chunk, but this is not the case. *Photon Paint* adds a custom chunk in front of the BMHD (see below for why) and this has caused some incompatibility with other applications.

The second line contains part of the data from the BMHD. The Wide and High fields indicate the size of the image in pixels. The Xorg and Yorg specify the starting position for the image (usually used for less than full window images). The PlMkCoPd includes: the number of bit-planes in the image, in this case six; the type of mask to be used with the image, this generally relates to the use of color zero; the compression mode used with zero indicating no compression; and a pad field that is currently unused but always set to zero for future compatibility.

Potential problems with data on this line include reader programs that cannot handle overscan (Wide or High too large) or that ignore the Planes field (reading a HAM image but assuming it is a low-res image). There are other possible problems, but you get the idea.

The third line (0200) finishes the BMHD with data on the Transparent field, used only if the Mask field specifies the use of a transparent color; Aspect ratio field; and the size of the screen the image came from. This size could be different from the size of the image, and in this case is. The third line also contains the ID and length for the ViewMode chunk.

The fourth line starts with the actual ViewMode data. This is the display mode the image will be shown in. For example, just because an image has 640×400 pixels does not mean that it must be shown in high-res interlace. It could be shown in low res, and an application could allow you to scroll around on the image. ViewMode flags include HIRES = 0×8000, HALF-BRITE = 0×80, and HAM = 800. The CMAP chunk also starts on the fourth line. This chunk stores color register data, in this case data for 16 color registers, the number used in HAM images.

Color register data continues on the fifth and sixth lines. On the seventh line the color register information ends, and the ID for the BODY chunk appears. The BODY chunk is where the actual pixel data for the image is stored. If the compression flag is set to one, then the data are compressed. Programs that ignore the compression flag will encounter problems reading files that do if they expect a compressed file when encountering a non-compressed file.

Those are the basics of an IFF ILBM. Not all ILBM's will have CAMG chunks, and most will likely have CRNG (Color register range) chunks used to control color cycling. There are other chunks that you may find as well, and new chunks are being added all the time. You may find a GRAB chunk used to mark the hotpoint of an object or a SPRT chunk used to indicate sprite precedence. The main idea is to be able to troubleshoot problem image files.

There are several ways to solve image file incompatibility. If you own a variety of programs that read and write image files, you might have found some problems already. You may also have found that if you read a problem file into some other application and then write it back out, it is no longer a problem. If this is the case you may want to explore what is being changed in the file. Take a look at a dump of the file before and after the conversion. See if you can identify a chunk that gets removed or rearranged. Look for chunks in front of the BMHD chunk, or after the BODY chunk.

Other approaches are to check problem files for byte length. All IFF files should have an even byte length. If you've downloaded a file from a BBS and it has an odd length, you've got a problem. There is a program called IFFcheck that will check to see if a file is a valid IFF file, but it doesn't do much else.

A more useful utility is DFilter. This program solves some problems caused by *Photon Paint* and *PIXmate* image files. *Photon Paint* inserts a proprietary IFF chunk as the first chunk of the file. *PIXmate* saves the ViewModes in the CAMG chunk, with the SPRITES and VP—HIDE bits on, which can cause problems in readers that don't mask these out. DFilter will reshuffle the chunks so that the BMHD is the first chunk, and modify the CAMG chunk if necessary. Dfilter works "in place," that is, it modifies the file you specify without creating a second file. If you feel uncomfortable about such a program modifying your only copy of a given image file, copy the image file to RAM first, run DFilter, and check with a display program before replacing your only copy of the image.

Programmers add custom chunks to add enhanced capabilities to programs. The custom chunk in *Photon Paint* files is used to reduce the amount of memory required to decompress compressed ILBM's. Since *Photon Paint* uses HAM images, this allows Amiga owners with no expansion RAM to use an otherwise memory-hungry application.

Creating a standard is always a trade-off between a multitude of factors. Speed, robustness, expandability and file size—each of these could be improved upon for a single application if the IFF standard were ignored, but at the cost of interchangeability between applications.

One proposed solution to this is the idea of an IFF.library. This would become a part of AmigaDOS and would be a library of IFF routines stored in the LIBS directory. Applications would use the IFF.library to read IFF files in a standard way, instead of each programmer having to add code to read and write data to the IFF standard. An application would request specific data about a file from the IFF.library which would read and parse the file and pass the needed data to the requesting application. This would free the programmer to work on other matters, reduce the size of applications and improve upon the interchangeability of files.

Several third party programmers and Commodore are currently discussing this concept in great detail. At this point in time it is not clear whether we will see a third party IFF.library similar to the ARP.library provided by the ARP project and used by many applications, or if Commodore will include an IFF.library in the next release of AmigaDOS. Perhaps both. ■

by Graham Kinsey

Amiga Public Domain

This month I have reviewed Fish disks 163 through 172, as well as programs from PeopleLink and BBS's. This month's highlights include *the* replacement for AmigaDOS's DiskDoctor command, a program that allows you to use FastFileSystem with floppies, plus a musical program created with *The Director.*

For each program the author is given when known. If the PD program is available on the Fish series of public domain disks, the disk number is given before the description. If I obtained a PD program directly from PeopleLink's AmigaZone, the AmigaZone download file number is indicated (if no file number is given it may still be on PeopleLink, but I obtained it somewhere else). When a public domain program has been classified as shareware, this is also mentioned with the suggested amount.

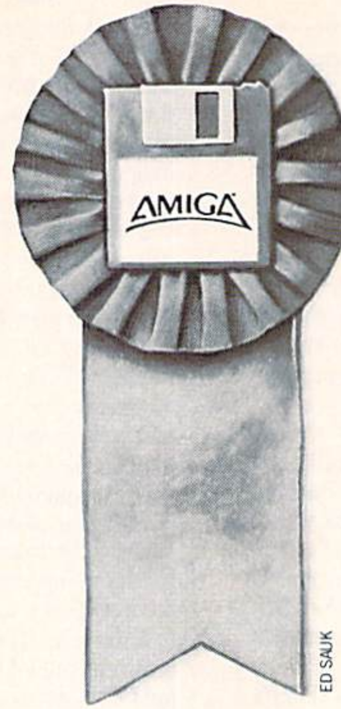
Due to the large size of animation files being released for the Amiga, I have decided to assume that the normal size of an Amiga animation is one megabyte. Unless I specify otherwise, *all* animations reviewed here require one megabyte to run. If you are an Amiga owner with only 512K in your machine, you should keep this in mind.

FiveInLine: by Njal Fisketjon (Fish 163)

This simple game is similar to Go-Moku in that you must connect five pieces in a row on a square grid. Not only is the play fast, but the computer opponent is also tough to beat.

MemTrace: by JoJo Wesener (Fish 163)

MemTrace can help programmers who want to make sure that they always free up all memory chunks that have been allocated. When called, MemTrace will signal you at the end of a program if a memory chunk hasn't been given back. MemTrace will also complain if you ever try to free something that you never allocated in the first place. To use this program just use freeall( ) at the end of the program to obtain a listing of what your program did wrong (by listing the offending line).



ED SAUK

View: by Bryan Ford (Fish 163)

View is a small text displayer. Unlike most other small text displayers, View is totally mouse oriented, therefore, this one is primarily for mouse lovers. Unfortunately, the program itself has no icon, so those who don't use CLI really can't use this program from Workbench unless an icon has already been created for a particular document.

Hed: by Hal Carter (Fish 164; Shareware: $20)

This is a text editor that beginners especially will gladly use instead of ED. Hed is only 8K larger than ED, yet is much more friendly than either ED or Emacs. Scrolling via the mouse is supported. Most of Hed's functions are accessed via the function keys. This might annoy those who are used to using the CTRL key for text editor functions, but beginners should favor this method. Hed uses a file requester (not a great one, but good enough) and has an icon for Workbench use. Unlike Emacs, Hed has only one menu strip, so that the user isn't overwhelmed with features at first glance.

PlotView: by Joel Swank (Fish 165)

A simple program that allows you to view UNIX Plot files. A utility is included to convert UNIX Plot files to Textronix 410x files.

Newton: by Daniel Barrett (Fish 164)

This program will calculate the roots of any polynomial (up to a 20th degree polynomial) using Newton's method. You can specify the accuracy that the program should use. Both real and imaginary inputs are accepted.

RamCopy: by Stephen Gunn (Fish 165)

Amiga users who have at least one megabyte of memory but only one disk drive no longer have to suffer the agony of disk swapping when copying disks. RamCopy will copy a disk in a single pass in even a one megabyte Amiga. However, for those who have only one megabyte (as opposed to those with 1.5 megabytes or more in their Amiga), RamCopy will work only if you have absolutely nothing else running in your Amiga, *including* the Workbench environment! Although the author primarily created this program for Amiga 500 users, it's also fantastic for Amiga 2000HD and Amiga 2500 owners (especially those with extra memory added), since the 40 megabyte hard drive makes it very difficult to add a second internal floppy in those machines.

AutoGraf: by Joel Swank (Fish 166)

This program can graph your auto log data. AutoGraf can create graphs of dollars per gallon, miles per gallon and dollars per mile. The author used *Superbase* to keep track of his entries, and he even provides the database files so that those who own *Superbase* can easily set up an auto database and input any data they may already have.

CloseMe: by Charlie Gibbs (Fish 167)

A great little graphics display hack to spring on people. If you think all windows behave nicely, think again!

DSM: by Foster Hall (Fish 167; Shareware: $15)

Short for "Dynamic Sound Machine," this program can load in a digitized sound file and create a fully executable sound demo. You can input the number of times the sound will repeat and change the period and volume of the sound. Since you can give each of the four sound channels a different period, you can create some interesting phasing effects (the author gives an example with one of the sample sound demos). The save option is not available in the shareware version, so you must send in the shareware fee if you want to create your own sound demos.

BezSurf: by Eric Davies (Fish 170)

BezSurf is a program that uses bezier surfaces of revolution to create impressive graphics. Whatever shape you can create on a lathe, you can create with BezSurf. Line and curve tools are used to create the actual mathematical image. You can then render the image in either wire frame or shaded mode. There is a control panel where you can alter all sorts of things. Here you can change the number of slices (in both relevant directions), the tilt angle and the starting and ending angles. You can change both the location of the light source as well as its illumination properties. The background color and ambient light values can be changed as well.

BezSurf works in any resolution mode, and you can also choose the number of bit-planes to work with. The author does have options for HAM and overscan modes in the menus, but they aren't usable at this time. You can choose between gray scale, red scale, green scale, blue scale or rainbow shading.

Perhaps the most remarkable option in BezSurf is that you can actually wrap an IFF picture around a BezSurf-generated object from within the program itself. There even are options in the control panel to select how many times the image is wrapped around the object in each direction. BezSurf will wrap grey scale images immediately for you, but if you choose to wrap a color image, BezSurf will output red, green and blue component images.

After using BezSurf's Mergergb program, you can send the combined file to the RAY2 program that is a part of the public domain ray-tracing packages DBW-Render (reviewed in the September '87 "Amiga Public Domain") and QRT (reviewed in the September '88 installment). Be warned that BezSurf is another graphics package that can chew up several hours to produce an image, but the results are worth it.

Turbo: by Oliver Wagner (Fish 170)

If you need to speed up a program, and don't need to constantly monitor it (like a ray-tracer, for example) Turbo can help. On command Turbo will turn off all bit-plane displays, as well as the copper and blitter and all audio channels. A click of the right mouse button will return everything to normal.

Xoper: by Werner Gunther (Fish 171)

This is another program that displays all running tasks and processes in the system and allows you to modify them. Although many other programs do this, Xoper seems to top the rest in terms of features. First of all, Xoper can give you a list of tasks, task signals, devices, libraries, ports, resources, interrupts, files, locks, current directories of each program, capture vector settings, windows, screens and/or memory segments. All of these lists are packed with information. For example, the task list shows for each task the task node, display type, status, priority, CPU usage, process number for DOS-Processes and taskname. Xoper updates a list or lists depend on the time interval currently set.

Displaying a list is only a small part of what Xoper can do. You can display each memory hunk that is being used by a given task. With Xoper you can change a task or a node's priority. You can send a break signal to any task. You can use the Snoop command to track the allocation/deallocation of a task's memory hunks. You can change the setting of any of the capture (ColdCapture, CoolCapture or WarmCapture) vectors. Any task can be frozen. All free memory hunks can be cleared. A library can be opened, or all unused libraries can be flushed from the system.

While all the above actions are safe, Xoper also supports a number of potentially dangerous actions, including killing a task, closing a window or screen, closing any library or changing the current directory of any task. One other nice feature of Xoper is that it opens a CON: window. This means that if you are running either Conman or AmigaShell, command histories and line-editing capabilities will be available from Xoper's prompt as well.

Handshake version 2.12a: by Eric Haberfellner (Fish 172; Shareware: $25)

Here's version 2.12a of Eric's renowned VT-52/VT-100/VT-102 emulator program Handshake, last reviewed in the May 1988 installment of this column. The biggest new feature in Handshake is that it now fully handles VT-200 and even VT-220 emulation (with the exception of user-definable keys). Other major additions include the ability to capture a screen (as an ASCII file or to a printer) and support of arp.library's file requester. Also for those who call BBS's that support ANSI graphics with Handshake, Handshake now supports color.

Amnix: by Magna Systems (AmigaZone file #14517; Shareware: $15)

Another program that attempts to make PC-Pursuit dialing easier. This program requires no creation of scripts, since it completely takes over from the main terminal program once you have connected to Telenet. Those who use Access! can simply run both programs and tell Access! to stop monitoring the serial port. However, with every other terminal program you must exit the program before Amnix can take over (and you must also make sure that your modem is set to force DTR, so the connection isn't lost when you exit the terminal program). Although Amnix isn't a terminal program in and of itself, there is an option to view all input/output to/from Telenet via a small window. The shareware version of Amnix is crippled in that it will only dial three cities. (Send in the shareware fee if you want to use the program.)

Capture: by Martin Hash and Ken Baer (AmigaZone file #14563)

This program captures frames from an animation and turns them into a Hash format (used with Hash Enterprises' line of animation products and utilities) animation. While Capture bears some resemblance in function to GrabANIM (reviewed in the September '88 installment of this column), which grabbed graphic screens and turned them into an ANIM format animation, Capture is a bit easier to use. Capture allows you to directly specify how many frames you want to capture, as well as where in the animation you want to start capturing frames. Although Capture doesn't save in ANIM format, a Hash format animation can easily be converted to ANIM format via Hash Enterprises' *Animation: Editor* utility (with which Capture is compatible).

DiskSalv version 1.32: by Dave Haynie (AmigaZone file #14684)

This is an update to the disk salvaging program DiskSalv, which was last talked about way back in the August '87 installment of this column. When DiskSalv first came out, its salvaging capabilities were already far superior to AmigaDOS's Disk-Doctor program. Unlike DiskDoctor, Disk-Salv never modified the original disk, and DiskSalv always had a better chance to salvage any damaged data files while keeping the unharmed data files intact.

But there were problems with the original DiskSalv that prevented some Amiga users from using it. The big problem with the original DiskSalv was that it required two floppy drives to work, and not every-

one has two floppy drives. Version 1.32 of DiskSalv is years ahead of the original version (both literally and figuratively).

One of the big improvements is that the input and output devices are no longer fixed. Instead of the output from DiskSalv going to DF1: it can go to RAM: instead. Obviously, this makes it possible for those who have only one floppy drive with a large amount of memory (more on how much memory later) to use DiskSalv! You could just as easily salvage to a hard drive. In fact, if you want to salvage the contents of a floppy to your hard drive, you can even specify an output path so that DiskSalv doesn't clutter up the root level of your hard drive. Similarly, you can salvage from a place other than DF0:.

You may wonder if DiskSalv can now salvage hard drives. The answer is yes. DiskSalv not only will salvage hard drives, but it will also salvage hard drives that are using FFS (FastFileSystem).

Another big change is the addition of the Ask command. You can tell DiskSalv to ask you whether you want each file on the input device to be salvaged or not. This is the other feature of DiskSalv that clearly makes it usable with just about any Amiga configuration. Those who have only one megabyte of memory (which is a bit tight if you want to salvage a full floppy disk to RAM:) can now use this command to easily pick and choose the files to salvage. Even those who have only a barebones Amiga configuration of 512K and no external drives can use DiskSalv to salvage files (as long as a file isn't larger than approximately 300K).

DiskSalv can now automatically format the destination device if you don't have any blank formatted floppies hanging around. Another major addition to DiskSalv is the ability to filter files to be salvaged according to whether one of the seven AmigaDOS protection bits is set or not. One useful application of this feature is for hard drive owners who use a hard drive backup program that has the ability to set the archive bit each time a backup is performed. If an error appears on the hard drive, you can easily ask DiskSalv to attempt to salvage only the files that were added or changed since the last backup.

DiskSalv now also adds a FileNote to any file that it believes is damaged due to a media error when it tries to salvage it. You can now also specify starting (including starting at the ROOT track) and ending tracks in order to tell DiskSalv to only salvage part of a disk. While DiskSalv is scanning an input disk you can abort the process by simply clicking on its close gadget, in case you change your mind.

I hope the long list of DiskSalv's new features has convinced you to *never* use DiskDoctor again, since thanks to DiskSalv version 1.32 DiskDoctor has finally been relegated to the status of a truly obsolete program.

FFSFlop: by Martin Taillefer
(AmigaZone file #14149)

Commodore currently states that the FastFileSystem cannot be used with floppy disks. But Martin has proven that FFS can indeed be used with floppies. Martin explains in the documentation that the only real problem is if you eject an FFS floppy from a drive, AmigaDOS won't recognize this fact. Now you certainly could use AmigaDOS's DiskChange program to get around this, however, if you forget to run DiskChange even once, you risk the possibility of damaging one or even two floppies.

Martin's answer to this is AutoDiskChange, a program that will automatically tell AmigaDOS when an FFS floppy has been ejected from a drive. Of course, the accompanying doc file gives complete instructions on how to set up an FFS floppy, including complete MountLists for FF0: (as opposed to DF0): and FF1:. Now Amiga users can not only increase floppy access with FFS, but also increase the storage capacity of a floppy by about 40K.

The Musician: by Victor Issa
(AmigaZone file #14709)

This is another example of how versatile a program *The Director* is. The Musician is a great program that enables people who have no knowledge of computers to easily play music on an Amiga. When The Musician loads, you are presented with a screen which is dominated by images of a keyboard, a set of drums and an Amiga. Each of these images represents a different instrument. By default the keyboard is active, and you will notice that this image has a bunch of waves (representing sound) moving away from it. Simply use the Amiga keyboard to play the current instrument, or click one of the other images to choose a different instrument. If you click on the Keys box, the key layout will be presented.

Above the keyboard layout is an image of a Yamaha keyboard, which will graphically show you what key on the Amiga keyboard produces which note on a musical keyboard. On the keys screen there is a box for turning off the low-pass filter.

There are also a set of boxes that actually allow you to record and play back music that you create with this program, using the input record/playback program Journal (reviewed in the December '87 installment of "Amiga Public Domain"). There is also an option on the main screen to load in a new instrument (presumably for the Amiga image). Although two extra instruments are provided with the program, the program uses IFF 8VSX format samples which are quite easy to find in the public domain, since they make up the majority of digitized samples. This program requires one megabyte to run, but for those who would like to show their friends how easy music can be generated on the Amiga, this is a great example.

Ovdemo: by John Nagle
(AmigaZone file #14623)

For those who are security-conscious, this program can help to make sure that nobody ever guesses what your password is by accident. Ovdemo tests a password for "obviousness" by matching every three-letter string against common three-letter strings found in many English words. Unless the program finds at least two three-letter strings in your password that aren't in the list of commonly-used three-letter strings, it will tell you that your password is too obvious.

AmiGantt: by Donald Tolson
(AmigaZone file #14649; Shareware: $15)

AmiGantt is a basic project management program based around a Gantt-type chart. Up to 500 tasks can be input per project, and projects within projects are supported. Histograms are supported in AmiGantt, but as of version 2.01 Pert charts haven't been implemented. Other features include milestone tasks, up to ten resources per task and a full Intuition interface.

RxSlides: by Dean Bandes
(AmigaZone file #14491)

RxSlides is a slideshow program based on the display program Dissolve (reviewed in the September '87 installment of this column). Although a few more wipes and features have been added (besides the simple slideshow capability itself), the most beneficial feature in RxSlides is its ARexx interface. For those who have jumped on the ARexx bandwagon, here's a slideshow program to add to your ARexx-compatible library of programs.

Although most of the entries from the BADGE Killer Demo Contest still haven't

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right of the checkmark was a thin, blinking line. "The text cursor!" To the left of the text cursor on the same line was the figure "A1". Since my Active cell was in column A and on row 1, it wasn't hard to figure out what that meant.

(Either this program is highly intuitive or I am. Probably both.)

I decided to start typing: 2-5-2. The figures appeared up there at the text cursor. My hands trembling with anticipation, I pressed RETURN. Just as I expected, a 252 appeared in the Active cell. Another thing happened after I pressed RETURN. The Active cell moved down a slot to A2. So I typed a number into it (353) and pressed RETURN. Zap, now I had two numbers on my worksheet and cell A3 was active.

I'm telling you all this in slow motion to demonstrate just how simple and intuitive this whole process is, even for a non-spreadsheet user. Truly, up to this point, it's a manual-less operation.

Okay, I decided. Let's make this third cell add the results of cell 1 and 2. I clicked here and there and discovered strange things happening. Obviously, even in the most intuitive setting, documentation is necessary.

Leafing through the manual I discovered this title on page 3-11: "Build a Formula." I discovered that to get cell A3 to add the contents of A1 and A2 I had to signify to the program that I wanted this cell to be a "formula" cell (my term). The equal sign (=) is the way to do it. So I typed one as my first character. Then I discovered that I needed to type the coordinates of the cells I wanted in my formula. So I typed A1 and A2. Lastly, I learned that I needed a plus sign (+) between the two. Here's what my edit area looked like: =A1+A2. (Keep in mind that I did this with cell A3 active.) Then I pressed RETURN.

Bingo. The sum of my two numbers (605) appeared in cell A3. I used my mouse to go back to cell A1, clicked it, and changed the contents. As soon as my new number was typed in, the sum was there.

Raw Power

Now that I had the idea, I leafed through the manual to find out what else was available. I discovered that I hadn't needed to type in A1 or A2, I could've just click on them. It works like this: once you've selected a cell as your Active cell, the edit line awaits input. If you type none, but instead click a different cell, then you have simply activating the new cell. But if you start typing on the edit line and then decide to click a different cell, that cell's address will automatically print at the cursor point in your edit line. The proper way to exit the edit mode is to press RETURN or to click on the checkmark.

This can be a great convenience. But it can also confuse you a bit at first. Sometimes you'll forget to exit the edit mode and you'll grab the mouse and click on another cell to work on it. Instead of activating that cell, you'll merely add its name to your edit line.

I also learned about another great convenience: ranges. For the example I just reported, the range—A1 to A2—is only two cells. No need to type a range there. But what if I wanted to add up all the cells in column A, from 1 to 100? Then I would choose my formula cell (let's say cell A101), then type =A1:A100. I would press RETURN and . . . get an error message.

What's wrong? You can't use ranges on a simple equal sign. You need to use a function.

Pages 4-20 through 4-22 listed the functions I could use. I scanned the list: ABS, INT, RAND, RND, SQRT, AVG, MAX, MIN, SUM, FV, PMT, PV, RATE, TERM, EXP, LN, LOG,:I, ATAN, COS, SIN, and TAN. Some of them look very much like BASIC programming functions such as ABS and INT. SUM is the one we want if we want to do a range. Type the equal sign, type SUM, type the range—like this: =SUM (A1:A100) —and press RETURN. (The parentheses are needed for all functions.) This will get you the sum of that whole column, instantly and constantly updated. Too constantly (I'll tell you why later).

If you take a look at the list of functions you'll see some pretty interesting choices. AVG will average a whole group of figures. If you have a whole column of numbers and you want to know what the average is, use AVG. MAX and MIN will get you the maximum and minimum values per range.

These four functions, SUM, AVG, MAX and MIN prompted me to think about designing a teacher's gradebook worksheet with *geoCalc*. It would be nice to be able to enter a column of grades and get immediate tallies on these items. I tried it and it worked great. But a tad slowly.

You may be wondering, what about the names of the students: how do they get typed in? Just type them in. Any cell can contain any information just like you could write anything you wanted on a ledger. Naturally, the number cells are the ones that give a spreadsheet power. The non-number cells you design are for headings and labels.

The width (but not the height) of your cells is easily altered: just move the mouse pointer to the row that identifies the columns (A–F) and place it on the right border of any column. Then click, hold and move. The column can be adjusted to as small as three spaces wide or as wide as 49 spaces. It usually doesn't matter if text spills over into the next column because as long as there isn't anything in that column, the whole text will print. (Check out the word "Consolidation" on cell F1 in the "Pumping GEOS" sidebar.)

Very intuitive.

Other nifty features include the ability to cut, copy and move cells and whole rows of cells just like you would with *geoWrite:* click, drag and click again. What's really great about this is that you can use relative cell references in your formulas. Then when you copy and move a formula cell, the formula will be relative to the new cell.

Explanation time. Let's say I decided to have column B, 1 through 100 also be added up just like column A. I could simply copy my formula for cell A101 and paste it into B101 and B101 would now add up the hundred cells above it: =SUM(B1:B100). The key to using relative cell references like this is make sure you don't precede the cell reference with a dollar sign ($). For example, my formula in cell A101 was: =SUM(A1:A100). Had I typed =SUM($A$1:$A$100) and copied it into B101, the formula would not read =SUM(B1:B100) but =SUM ($A$1:$A$100). No matter what numbers I typed in that B column, my results would always be the same as column A.

These dollar-sign cell references are called absolute references. Sometimes they are what you need, sometimes not. The important thing is, they're there and they're easy easy easy to use use use. You could even, if you wanted, make the row absolute while keeping the column coordinate relative. Like this: ($A1:$A100). Or vice versa.

This is not just friendliness, this is power, my friends, and, *geoCalc* has it. Other power-moves include selecting a multi-column area of grid to move, copy or whatever. Just use the mouse like you would to highlight text with *geoWrite*. The function list mentioned above shows more muscle (see the "Pumping GEOS" sidebar for an example of how to use the payment [PMT] function). The printing capabilities (a nice

graphic printout with selectable ranges) are really nice. And being able to move information back and forth between *geoCalc* and *geoWrite* (and *Paint,* if you use Paint drivers), is a bonus.

Yes, *geoCalc* is intuitive, powerful and . . . slow. Okay, are you ready? It's time to meet:

Mr. Calc *[Scary Background Music]*

With simple worksheets doing relatively few calculations, speed isn't a big problem. Scrolling is a pain, but it's endurable. But once you start adding formulas, things begin to crawl. It might take a minute or more to re-calculate things after entering a single number. A minute waiting at the computer is longer than a minute waiting at the microwave, which we all know is close to an hour long. (Time is relative, of course.)

Had I done just a cursory review of *geoCalc,* I might not have noticed the sluggishness of things. Using the sample worksheet included, things are quite brisk. A home budget can be created which is fast enough. And had I had an REU to work with (there's a long, boring story behind this which I'll spare you), I am sure I would've felt much better.

But, as I said, I wanted to create a teacher's gradebook, a very calculation-intensive project. It was so easy to create, so logical to do, that I couldn't resist doing a banner job. I made column A my Student Names column. The rest were all grades columns with a few subtotal columns sprinkled in. I made it so that I could type a set of grades and, upon completion, the bottom four rows would tell me the total possible, the high score, the low score and the average. And it worked. Sluggishly.

Then I decided to have *geoCalc* constantly total each student's total points as any new grade was entered. I created a new column A to the left of the names, and put a formula in place to do this. It too worked. Real slowly.

I decided, hey, why not have a tally at the bottom of this column for high, low and average too? So I did it. It worked, but at roughly the same speed as amoeba evolving into men.

I exaggerate. Again, if I had been using an REU I have no doubt the speed problem would've been less objectionable. But lots of you users out there don't have REU's and, while I recommend them highly (if you can get one), I feel responsible as a journalist to at least have a feel for using GEOS at a level that you can identify with. Besides, there could have been a simple solution to the *geoCalc* traffic jam. Shut off the calculations.

Lots of spreadsheets allow you to shut off the calculations so that you can input new numbers without constant updating. *GeoCalc,* as far as I can tell, doesn't. Page 4-16 of the manual states: "All calculations are made automatically when a formula is entered. If the value of a cell that is referenced in a formula is changed, then that formula is automatically recalculated." It is my sincerest hope that a future version of *geoCalc* will allow you to shut off the calculations until you want them.

Until that happens, we users need ways to deprive Mr. Calc of his sustenance: excessive cross-cell calculations. Here are some geoPsych tricks:

1) Don't create spreadsheets which require massive cross-cell referencing.

2) IF you must, then before entering any numbers, activate the formula cells that require the most cross-cell referencing and place a dummy mark there similar to a BASIC REM statement.

3) Leave a column free of calculations. Then, when entering a new string of numbers, enter them there. Complete by copying and pasting them where they should go so that all the calculations are performed at once. Finally, take a break and finish *War and Peace.*

4) Buy a RAM Expander. Now that the trade agreement with Japan over DRAMs is about over, the prices should fall. If the government decides to continue with the embargo (insane, but possible), you can spend time while Mr. Calc is doing calculations to hand write letters to all your Congressmen pleading with them for free trade.

I'm sure that a lot more tricks can be gleaned by *geoCalc* users for ways around the slowness problem. One must ask, however, if it is worth the trouble. There are plenty of spreadsheets available for the 64/128 that are as powerful and much faster. None are as friendly. Most are more expensive. I conclude that *geoCalc* is a worthy addition to your GEOS library if you can answer Yes to any of the following: 1) you have an REU, 2) you are not going to be doing formula-intensive spreadsheeting, 3) compatibility with *geoWrite* is crucial to you, or 4) you want something that is very easy to learn.

I like this product. I will continue to use it for several things (but not for grades). When I get my REU back (long story, don't worry about it), I'll use it more. When Berkeley comes out with a shut-off calc option, I'll use it a lot. ■

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missing line should magically reappear. In case you didn't realize it, you can use the cursor up/down key to scroll through the previously-entered lines of your message in case you forgot what you were saying.

New on the Q

There are lots of changes happening around the system these days, most for the better. In addition to the Adventure Link game and supporting areas I mentioned last month, there are other new online games being added. At press time BOXES was being added, but I was having trouble downloading a copy of the game, so I'll have to cover that one in another column. There are other new games and services coming, but I can't talk about them until they're ready to be released. With the magazine's lead times you'll probably find out about the new games online first, and we can go over some of the details and hints in later columns.

Lots of changes are in the works, so be sure to check the various informational messages posted from time to time in Customer Service and within many of the areas of the system. Some of the clubs were removed from the system while a few special interest areas were relocated to a new area called The Interchange in Just for Fun. As new services are released, some of the older and less-used areas or services will unfortunately be sacrificed, relocated or merged with other sections to make way for the new areas. Be sure to watch for system announcements as changes are implemented in the future.

By the way, several new areas have already been added in Just for Fun to further support People Connection. You'll now find the Auditorium Green Room, a back-stage area where actors and participants can learn how to utilize all the functions available when you're asked "on-stage" or practice in your own production studio for PC. A guide to coming attractions can be found in Tonight in the Limelight. Plus there's also the Producer's Picks and Pans, with reviews of the previous nights' shows and rooms by Miss Jules. And, if you have ideas for rooms or events, you can post them in the Center Stage area.

Well, that's it for another month. Please let me know if you have any hints or suggestions to share with other users, your input is always welcome. You can reach me daily via E-mail to RBAKER on Q-Link or RBAKER PC on PC Link. ■

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The Program

Getting pictures of the debris field was one thing. Constructing an exciting game around them was a totally different story. That assignment was given to Codesmiths, Inc. (a two-man development team based in the Miami area). Jeff Jones is 23 years old. He's happily single and his hobbies include: skin diving, roller skating, microcomputers and stunt kite flying. Sean Puckett, on the other hand, is a 22-year-old car nut. Puckett is equally single and enjoys reading the latest book or magazine about his favorite subject. Both programmers previously worked for Hi Tech Expressions, where they created a number of titles including Printpower, Awardware, Jingle Disk *and* Ziggy and Popples *holiday disks.* Search for the Titanic *is their first official Intracorp release, and this is how it all came together.*

Jermaine: How were you drawn into the *Titanic* project?
Jones: Whenever something goes wrong these days, we usually blame it on Angie Niehoff *[he laughs]*. Angie, one of our friends at Hi Tech Expressions, moved on to work for Intracorp early in '88. When the company needed some new developers, Angie contacted us and set up a special meeting. On July 19, 1988, we talked things over with Leigh Rothschild, president of Intracorp. Sean and I weren't really interested in the *Titanic* before the assignment, but it kind of grows on you (if you know what I mean). We agreed to write a proposal for the game and keep the project within Codesmiths, Inc.
Jermaine: How did you proceed?
Puckett: Ten days later, I finished the proposal and took it over to Intracorp. It was 30,000 bytes long, and barely scratched the surface of what we wanted to do. It really didn't look like much, with its eight typewritten pages and two pages of lists. We believed, however, that this was the beginning of a spectacular project.

On August 1, I assumed the project was go. We received a small advance a short time later and so much a month for the next three months (against a staggering $3,000 per month development cost). Incidentally, taxes were not covered in this financial arrangement. Jeff was working on several Hi Tech Expressions projects at the time, so we thought it was possible to make ends meet. Later that day, I wrote a lot of the user interface code. My work was actually beginning to look like a program. The source file quickly expanded to 575 lines, which is a lot of code when you're half asleep. I really wasn't getting much rest at that time. Maybe I sensed the difficult days that lay ahead.
Jermaine: Tell me more about the early days of the project.
Puckett: I recently kept a five-day diary to illustrate a point: anything can happen when we design and program a game. Incidentally, the diary picks up where the last answer left off. *(See box, page 93.)*
Jermaine: Can you tell me more about the making of the program?

> *"Search for the Titanic* features 75-100 of the most spectacular shipwrecks of all time." —Puckett

Puckett: When I finally got *Maps and Legends*, new problems suddenly materialized. Most of the islands (at least the ones I wanted to use) were not in the book. As things progressed, I had to touch up every digitized map by hand. When all is said and done, there will probably be 100K of them in the game. The average map compresses down to approximately 1000 bytes of code. We also came up with an attractive color scheme: white represents land, blue was used for water, black indicates a port, and red tells you there is hazardous water in the area. Generating Norway on a map was a real pain. The bloody coastline looks like a . . . I dunno. It also has islands all over the place. If I had a solid database of the world's coastlines, in $\frac{1}{10}$ degree resolution, I would happily throw away about a week's work.

As time passed, we gradually came up with 50 first and last names for the work force pool. In the end, this works out to 2,500 combinations of names that can now be found in the program.

I'm currently working on weather simulation. We wanted to put hurricanes in the southern latitudes, but it was hard to recreate them in a microcomputer environment. Some of those storms are more powerful than others, and hurricanes in the Atlantic are fairly rare—they usually develop three or four times a year. I also believe these mighty storms are less of a threat to shipping these days. Scientists use satellites to watch their birth, monitor their movement, and basically keep an eye on them. So any captain worth his salt can generally stay out of their way. The Woods Hole people confirmed my suspicions: they said hurricanes are a major problem in the Pacific, but they're no big deal in the Atlantic where most of our diving takes place.

In northern latitudes, the user has to deal with ice flows and icebergs during several months of the year. Under certain circumstances, your vessel can suffer the fate of the *Titanic*. Whenever you strike an iceberg or flow, for example, the integrity of your hull begins to decrease. If that number hits zero, you'd better know how to swim. By the way, the user can actually radio for help if he thinks his vessel is in serious trouble.
Jones: *Search for the Titanic* contains about 47 ports. You start out in Miami, Florida (for obvious reasons). But it doesn't mean you have to buy a boat and begin an expedition at that location. If you live in the "Big Apple" and wish to start out there, you can fly to New York City for approximately $500. You can actually fly to any port on the map, but it pays to remember you're operating on a limited budget.

Each port also has a specified technology level. This numeric rating determines the price of ships, equipment and labor in that area. You don't want to purchase a mini-sub in Dakar, Senegal, for instance, because the port has a low technology level. This means the mini-sub will have to be flown in from some other place, possibly the United States. It can also cost you up to 50% more than the same item being sold on our eastern seaboard. A low technology level is also an indication that the local work force has a limited degree of experience. I'm sure the user can hire crewmen at bargain prices there, but they may not be qualified for the job at hand. So use good judgement whenever money becomes an issue.
Jermaine: Is *Search for the Titanic* a graphic adventure or an arcade game?
Jones: It's certainly not an arcade game, and it doesn't resemble the graphic adventures I've seen to date. Our program is an authentic simulation of underwater archeology and modern oceanography (even though you never become a frogman in the game or operate the controls of a mini-sub). The user literally becomes the supervisor of numerous underwater expeditions. He evaluates the data from his state-of-the-art equipment and makes all of the diving decisions. In many respects, the program seems to simulate Dr. Ballard's life from the time he left college.
Jermaine: How does the game begin?
Puckett: You automatically start things off with $10,000. Even though that's not enough money to search for a wreck, there

are 10–12 companies out there that might give you money if you ask for it. These organizations were actually patterned after foundations and the like in the real world. We may use mutilated versions of their names, so no one will get upset by the way they're depicted in the program. Woods Hole, for example, is called Forest Pit, while the program's Shakeaman Foundation sounds a lot like another famous foundation.

There're probably ten different ways to make a proposal for a grant. You can tell them you wish to dive for publicity purposes, oceanographic research, etc. So you fill out an application, submit it to an organization, and they will get back to you on the matter. If their response is yes, you're in business. When the answer is no, they may or may not give you an explanation of why. It's even possible to get a partial grant or multiple grants at the same time. Whatever the case, there will always be a company or two that gives money to someone who has little or no experience. They won't give you much, but it's enough to get started.

Jermaine: Do you need to purchase the largest ship to do the job right?

Puckett: That's an interesting question. A specific operation generally requires certain pieces of equipment. Taking that into consideration, the user needs to purchase or rent the smallest ship that can carry the equipment he plans to use. This keeps the expedition economically sound.

Jermaine: What is the best procedure for hiring a crew?

Puckett: Whenever you enter a port, the program generates a work force of 100 people. Each person in the pool has a randomized name, degree of talent, amount of experience and salary demand. A wise player can save a lot of money by hiring crewmen with dual talents. They must, however, be non-conflicting jobs.

In the beginning of the game, it's wise to hire a captain/navigator, technician/doctor, etc. This is definitely the best way of doing things, but it doesn't always deliver satisfactory results. Sometimes an employee gets tired doing all that extra work and starts making a lot of mistakes. If this happens, the crewman isn't a bargain any longer. In fact, he can cost you more money than hiring two people to perform a single task apiece. So it pays to save money, but don't over do it.

Jermaine: Do you have much equipment in the program?

Puckett: *Search for the Titanic* features eight useful items: a regular sonar unit, deep sonar unit, weather radar, an underwater suction tube, the bathysphere, mini-sub, magnetometer and camera platform. Our sonar device actually resembles a side scan unit (not the traditional scope displaying a 360-degree sweep). A side scanner gathers information from the direction its sensor is pointed and keeps a permanent record of that data on paper. In the game, however, we had to develop a chart recorder that scrolled the data across the screen. This record isn't really permanent, but you have a minute or so to examine the readings before they disappear. Deep Sonar enhances your ability to scan the ocean depths, while weather radar allows the user to monitor storms in the area.

> "It's certainly not an arcade game, and it doesn't resemble the graphic adventures I've seen to date." —Jones

Divers use the suction tube to recover objects buried in sand. This giant vacuum cleaner operates at depths of 100 feet or less. All of the material it sucks up from the ocean floor is eventually deposited in a wire mesh basket. Sand sifts through and solid items remain. The suction tube is also very efficient when it comes to recovering artifacts the average diver might miss.

I'll tell you about the bathysphere and mini-sub later.

The magnetometer is another piece of valuable equipment. It detects metallic masses beneath your vessel.

Last, but not least, we have the camera platform. This special underwater sled contains a video camera and sonar unit. As you tow the platform behind your ship, it monitors the fractal-generated seascape. The ocean floor can be flat and almost featureless, or at other times it might resemble the Badlands of North Dakota. Everything varies quite a bit just like the real thing. If the seascape is flat, you should be able to pick out cannons and the like on the ocean floor. In more rugged terrain, it's going to be tough to identify anything.

Jones: Oceanography is definitely a rich man's game. The magnetometer costs $5,000 (in the game), while the mini-sub has a price tag of $750,000. We also had problems researching this unusual equipment. We picked up several books along the way, which told us how sonar and the magnetometer operate. In some cases, Sean and I had to make some educated guesses. After all, we didn't know anyone who owned or operated that kind of stuff. Under the circumstances, I think it's safe to say our equipment is fairly realistic (even though we haven't seen any of it in operation).

Jermaine: Would you tell me about the wreck sites?

Puckett: We found an incredible book at the public library, that listed approximately 12,000 wrecks. This amazing publication contained a complete listing of wreck sites, covering a period from the early 1500's through the late 1800's. *Search for the Titanic* features 75–100 of the most spectacular shipwrecks of all time (including Spanish treasure ships like Mel Fisher's *Atocha* site). We selected certain wrecks for the game because they yielded interesting artifacts or contained a lot of treasure.

Jones: Exploring a software shipwreck is similar to diving on the real thing. When searching for the remains of a specific vessel, you know where it came from, when it sank and approximately where it went down. There's absolutely no way you can predict what's down there, however. Smuggling was very popular in the past, and cargo manifests are usually inaccurate. So divers really get excited when they discover gold and other artifacts in places they wouldn't expect to find them.

Incidentally, the items you can find at a particular site are determined by the type of ship it was, and when the vessel went down. You won't find Spanish gold, for example, in the remains of a ship like the *Titanic*. In fact, the debris field contains objects like wine bottles, shoes, dishes and a porcelain doll's head. Spanish wrecks off the coasts of Florida and Mexico typically contain cannons, gold coins, cannon balls and related material. When you find an object, one of two things will happen. You'll see a black and white digitized picture of the item, or a message will appear on the bottom of the screen, telling the player what his people have found. Either way, the user receives reputation points for anything and everything his people discover. Each wreck will probably contain two or three digitized pictures and approximately a dozen artifacts. By the way, about half of the digitized pictures in the game can be found in the *Titanic*'s debris field.

Puckett: As we worked on the wreck sites, Jeff and I developed an interesting form of software protection. Each wreck has a spe-

cial number which can be found in the instruction manual. So when you tell the program you're looking for a wreck, it is the only wreck you can find at that time. In other words, the player can travel over another wreck, with his sonar down and operating correctly, and it won't detect a thing. Since the user has the manual, he knows where the ship should have gone down.

Players with bootleg programs are in for a big surprise. They'll have to search about 14,000 square miles of ocean, just to locate one particular wreck. I'm not even sure I could find a site under these unusual circumstances. Of course, you can always copy the manual, but it's going to be a large one.

Jermaine: What happens when you perform a dive?

Jones: First of all, let's talk about diving in general. In the original concept, it was supposed to have more of an archaeological theme. You would examine wrecks, recover objects and sell them to various museums. This idea initially sounded great, but most of the people who dive on these sites are usually treasure hunters. So Sean and I came up with an alternate plan of action. The user could earn experience points by locating wrecks and recovering their relics.

We thought about having a treasure hunter option, where you would sell gold and artifacts to finance your work. Treasure hunters don't receive grant money, so it sounded like an interesting experience. But the Woods Hole people didn't like that idea. The selling of gold and artifacts was a very touchy subject. Let's face it. Some people will do anything and everything to obtain gold and treasure. Over the years, greedy individuals have destroyed important underwater sites (keeping no record of their "finds" and where they were located). In the end, the divers had their treasure alright, but science lost valuable information that couldn't always be found at other sites. It's really kind of sad.

Puckett: Diving in the program tends to be more figurative than it is literal. We didn't think it was practical, for example, to have you actively manipulating a diver around the ocean floor. Since wreck sites can span a distance of 100 yards or more, and you're weighed down with heavy diving equipment, it's pretty slow going. In fact, it would probably take you hours (maybe even days) to properly search a wreck site in real time. So Jeff and I created a special speed-up key. If I wanted to perform a three-hour dive, for example, I could actually do it in five or six minutes. This feature doesn't speed things up by a percentage. It simply removes the delay loops from the program.

Whenever the player locates a wreck, he automatically enters the dive mode of the game. The screen will display a map of the site, which has been subdivided into a number of different sections. After examining the map, you can send divers down

> "Now how many computer games have non-violent historical themes? Maybe this is the direction of the future." —Puckett

if the water is shallow enough or use the mini-sub in deeper water. The bathysphere is another valuable tool. It enables a diver to perform more efficiently, where he doesn't have to go through a decompression routine, return to the surface as often for air, etc.

Whatever the case, you send your people down to an area on the grid and instruct them to search it for a specified period of time. Who knows what they will discover down there? It's also possible to search an area several different times and discover new artifacts you might have missed before. This entire operation is simple to use, easy to understand, and a good simulation of diving procedures.

Jermaine: Let's talk about the *Titanic*. How do you locate and dive on that particular site?

Puckett: The player needs approximately 200 experience points to get the proper funding for the mission. You might get five points for locating a wreck, and another two to three points for finding each item at the site. These reputation points gradually add up, making it easier to acquire grant money. If you have trouble obtaining a grant, an accountant will examine your proposal and tell you what's wrong with it. By the way, the *Titanic* expedition will probably cost you $4-5,000,000.

Once you get the money, it's time to prepare for the voyage. A smart player purchases the best of everything for this particular assignment. He buys the biggest ship with the best equipment and hires the most experienced crew. When all is said and done, you will need about 40 people (for 360 days) to help you locate and dive on the *Titanic*. I also recommend the purchase of repair parts. If something breaks down at sea, you repair it there or return to port. The latter can cost you valuable time and a great deal of money. Incidentally, St. Johns, Newfoundland is my base of operations for a *Titanic* mission. The port has food and fuel at a reasonable price, but don't hire technicians there. It has a low technology rating.

Jones: Then you tell the program you're looking for the *Titanic*. This is done by consulting the manual, which gives you the wreck number and the general area where the ship went down. Once you arrive at that location, drop your sensors down and just cruise around searching for the wreck. You can operate all four pieces of equipment, or just one item at a time. It's also interesting to note that you can't monitor all of these devices at once. So the player has to rely on his crew to tell him when they see something unusual.

Discovering an unknown item on the ocean floor doesn't always mean you have found the *Titanic*. A good oceanographer examines all the facts and makes the decision to dive or move on. Don't send the mini-sub down to investigate anything and everything. This practice can cost you thousands of dollars, and it wastes a lot of valuable time. Some unknowns are obviously not from a wreck, so learn to identify them both visually and by their readings. Most of these items turn out to be things like engine blocks and old rusting cars.

Puckett: Finding what might be the *Titanic* is one thing. Confirming your suspicions about the site is another matter altogether. When you discover something peculiar down there (and assuming you have enough food, water and fuel on hand) examine the site with your mini-sub.

Sometimes the player must return to port for supplies. When you have to leave a possible dive site, use the handy player reference chart to get you back to the proper location. Whatever the case, the user sees streams of beautiful digitized pictures when he discovers the remains of the great ship.

The object of the game is simple: you must find three heavy duty safes in the debris field and locate all of the artifacts there. If you think this sounds easy, think again. The player has to search an area several square miles in size. You also have to deal with another problem. When a safe drops hundreds or thousands of feet and strikes the ocean floor, it usually buries itself in the mud. So don't expect to find these safes standing out in the open somewhere. In fact, locating one of them is a major victory for the average user.

Exploring the *Titanic* should be equally

Five-Day Diary

August 2, 1988: Code-wise, things are pretty smooth. The structure of the program is falling into shape nicely. I picked out the ports for the game by looking at an atlas and made up the names of the ships. Soon I will have to come up with the names of people, their capabilities, and salaries. These individuals can eventually become members of your crew. More user interface has been completed.

This program is going to be very sophisticated. I'm worried that some computers won't be able to handle a game of this intensity. We may need more ports.

Euuch! Parenthesis stink, semicolons rot, and braces are crap. "C" handles double-shot character arrays like I'd handle dirty diapers. But the program continues to grow. Source code has grown to 850 lines. I'm adding ship data now. It's all bogus at this point.

August 3, 1988: Most of the program has now been converted to 40-column text. It used to be in IBM graphics mode (CGA/EGA). I converted everything over because the menu structure must be 40-column compatible before we can use it on the other machines. We have 964 lines of code (most of them re-written since yesterday). I put in the ship buying/renting stuff. We talked for three hours with Leigh today. *Titanic* is a definite go.

August 4, 1988: We need to add non-real ports to the program, where you can't buy or sell boats and equipment. They're just food/fuel stops only. All the little ports should also be present in the game. That will be easy enough to do. I can put a marker pixel on the maps. If a player intersects it, the port comes up on the screen. Fixing and selling ships is now in the code. I revised it where you now have a hard time making money on a boat, which is good. The point is not to make a fortune trading boats, but to get grant money (just like in real life).

People are now in the program; 64 of them. We have 1,438 lines of code. Jeff promised to order *Maps and Legends* right away. It will allow me to generate fairly accurate charts for the game. I still don't know how to handle the curvature of the Earth on the screen.

August 5, 1988: The exterminator woke me up. I swear he sprays little bug eggs. You never see any bugs until he shows up. Then they dance around on your nose. Jeff's brother came over, and we rapped about the business for a while. Very little *Titanic* work was done today.

August 6, 1988: The buying and selling of equipment is now in program (as yet untested). It didn't work the first time I tried it. Oh well. I think it needs a few adjustments. I'm presently adding crew menu stuff.

Source code is up to 1,655 lines. When it reaches 2,000 lines, I have to break it up. The game also features boat capacity checking. You can't buy a boat, or sail a ship that your equipment won't fit on, or if it weighs too much for the vessel.

Search for the Titanic will actually be three games rolled into one. First of all, there's the "Outfit Properly" game. It challenges the player to obtain grant money as he looks for a decent boat at a reasonable price. Then you have to hire a good crew and purchase the right mix of equipment. Other factors also come into play. You have to estimate your time at sea before you can purchase provisions for the crew. The user also has to calculate his travel distance in order to figure out fuel requirements.

I call the second game "Find the Boat." It consists of locating and diving on a variety of wrecks, which will earn you a number of reputation points. The player also gains experience for the most difficult operation of all: diving on the *Titanic*.

Last, but not least, we have the "*Titanic* Mission." To finish game three, you'll probably have to play games one and two about eight times.

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entertaining. If you cruise in too fast, you can smash your camera platform against the wreckage. When you're too far away from the debris field, it's easy to miss a number of objects. After all, you have to be right on top of them to view their digitized pictures. The lights on the mini-sub also have a limited range. So I think you can see, we've carefully researched this whole operation.

Jermaine: How authentic is your depiction of the *Titanic?*

Puckett: The two pieces of the vessel are separated by a vast debris field just like it is in real life. Everything has been drawn to scale, including the distance between the two pieces. We even asked the Ballard people to examine our work and tell us how to improve it. I was pleased to learn most of their comments dealt with facts and figures in the program. The prices of ships, for example, were extremely low, and Woods Hole rents its mini-subs from the U.S. Navy. They don't actually own their submersibles. When we talked about the diving aspect of the game, they seemed to be pleased with what we had done.

Jermaine: You talked about digitized pictures. Tell me more about them and how they were made.

Puckett: It's hard to generate high-contrast pictures when you have poor images to work with in the first place. The Ballard photos were extremely murky and everything had a blue tint. This meant I couldn't use them in their original state. So we took the slides that Woods Hole sent us and shipped them off to a photographic lab. They converted the slides to contact prints and placed them on a single piece of light-sensitive paper.

Jones: Before we go any further, I'd like to tell you about contact prints. If you remove the frame from the average slide, a tiny piece of negative remains. These negatives are placed on photographic paper, and someone shines a light on them for several seconds. You end up with a sheet of black and white images that are exactly the size of the negatives. Why do we follow this procedure? It's very economical and allows us to work with numerous photos simultaneously.

Puckett: We eventually take these contact prints and load them inside the scanner. Using our special digitizing program, we quick scan the sheet which produces a collection of miniature pictures. If I want to work with a particular image, I put the cursor box around that item, scale it to the proper size and add some dither. It's a hairy operation.

Jermaine: What is a dither?

Puckett: A dither pattern is half-toning, where you vary the ratio of black to white in order to generate many shades of gray. The 64, for example, has five grays. There's white, light gray, medium gray, dark gray and black. Using a five-shade dither pattern, you can go between black and dark gray, for example, and create five new grays. So it's possible to increase resolution on the screen by expanding the traditional five shades of gray to 25 shades using dither patterns. This technology doesn't deliver photo-quality images on the 64, but I think they look good (considering the fact they're microcomputer pictures). By the way, we don't like to touch-up the images very much—it makes them look more like art and less like digitized pictures.

Jermaine: Is there anything really unusual in the game?
Jones: One item immediately comes to mind. As we constructed the maps, it soon became apparent that we didn't need to map out the entire world. After all, most of the wrecks were located on the main trade routes. But what happens when you sail off the edge of a map? At present, the user sees a picture of a beautiful clipper ship sailing off the edge of the world. Ancient mariners believed this would actually happen if you went too far into unknown waters. Fans of the rock group Kansas will also recognize the image. It came from one of their album covers. We can't use their picture, for obvious reasons, but it's possible to create something similar for the program.
Jermaine: Will *Search for the Titanic* start a whole new gaming trend?
Puckett: Anything is possible, but the consumer will make the final decision. *Search for the Titanic* is an authentic simulation of a real-life adventure. Now how many computer games have non-violent historical themes? I can't think of many titles, off hand. The industry is presently going through a military simulation trend. Maybe this is the direction of the future. I'm sure we could generate more ocean-searching games. In the coming years, we might even have the player looking for new deposits of oil, gas, precious metals, etc. This could be done using satellites, computers and advanced photographic equipment. When all is said and done, I believe our *Titanic* program is merely setting the stage for bigger and better things.
Jones: I like the idea of going to the moon. Once the player gets there, he can look for the remains of satellites or examine historic lunar landing sites. You could even travel to the edge of space, where you rescue objects that are about to burn up in the atmosphere. All of the concepts mentioned above are merely pipedreams today. But it's only a matter of time before they too become reality like searching for the *Titanic*. ■

The Discovery

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Jermaine: Everyone knows you located and dived on the *Titanic*. What inspired you to look for the liner in the first place?
Ballard: I'm an explorer and spent most of my life looking for things in the deep sea. The *Titanic* was one of those mountains that had yet to be scaled. Its close proximity to Woods Hole (and the fact I could get out there) made it a logical place to test new equipment.
Jermaine: Tell me about the *Titanic* missions.
Ballard: We found the remains of the vessel in 1985 and dove on it during the summer of '86. That mission lasted 12 days. I returned to the site in 1987. When all was said and done, we dived on the wreck 11 times taking approximately 60,000 photographs and 100 hours of video tape. Unfortunately, a lot of pictures have very little value.
Jermaine: Are you learning anything from the photos and videotapes that were taken by other expeditions like the French group, for example?
Ballard: I would call that a rape, not an expedition. That was a bunch of people going down and taking things off the bottom. They even recovered shoes from the *Titanic* debris field. These were the final remains of people who died when the ship went down. So I don't see that as a legitimate expedition.
Jermaine: Do you still believe the *Titanic* was sunk by the infamous iceberg, or have other books on the subject proved that something else might have caused the disaster?
Ballard: First of all, there are no books coming out that support the claims of the French team that appeared on the Telly Savalas *Titanic* [television] special. They made spectacular unfounded claims to draw the public into watching that travesty. There was no data to support those claims. It was a complete Hollywood schlock.

The mysterious hole they mentioned in the special was on the starboard side forward. It was caused by the collision of the *Titanic* with the ocean bottom (which was actually more traumatic than the ship's collision with the iceberg). That hole is nowhere near a boiler. The coal bunker fire that they talked about was well known, well documented, and well extinguished before the *Titanic* struck the iceberg. The size of the opening that caused the sinking is another well-established fact.

It has been calculated by many different experts over the past 75 years. The size of the opening was 12 square feet. If you spread 12 square feet over the length of the gash, it works out to ¾ of an inch. Now that's not a big gaping hole. People actually saw where the water was coming in, and it was where the plates separated. To understand this statement, I need to tell you more about the ship.

The skin of the vessel was composed of plates that were stapled together with rivets. Ships were not welded together back then. When those plates encountered the iceberg, it simply popped the rivets. I went down and put my face within 18 inches of those popped rivets and actually saw the gash. It was not the size of the opening that sank the *Titanic*. It was the length of that opening that did it in.
Jermaine: So you agree with the old theory that the iceberg did the damage to the ship?
Ballard: Of course I do. There's no credible counter theory. Just because some yo-yos stand up and make fools of themselves, saying things that are totally unfounded, it doesn't make them right. Every expert in the world agrees the *Titanic* was sunk by the iceberg. Those other ideas are like saying John F. Kennedy was killed by Martians. And someone is constantly asking me what I think of that "Martian" theory. For the record, it's total balderdash!
Jermaine: Do you plan to return to the *Titanic* someday?
Ballard: Not in the forseeable future. We might do a better photo documentation of the site in the coming years, but we have no reason to go back there now. Mother Nature did her damage to the vessel during the first five years it was on the bottom. The *Titanic* really hasn't changed much over the last 70 years until the French team came along and recovered a number of artifacts. There's no reason to think it will change very much during the next 70 years. As our technology base evolves, I'm sure we'll go back there and re-image it. But I don't see that happening for the next five to ten years.
Jermaine: What are you working on now?
Ballard: If you look at where we are, in terms of underwater exploration, mankind has seen less than $\frac{1}{10}$ of 1% of the ocean floor, since 70% of the planet is covered by water, and very few people are exploring it. At the rate we're exploring it

> "The purpose of the Jason Project is to motivate young people and get them excited about science and technology." —Ballard

with manned submersibles, it will be centuries before we see the vast majority of our world. That's because the average depth of the ocean is 12,000 feet, and the *Titanic* sits at that depth. When we were diving on the wreck, it took us 2½ hours to get to work in the morning and 2½ hours to commute home at night with only three hours of bottom time. And that was with a three-man crew.

So we're presently developing the Argo/Jason system. It's an exploration technology base that is more efficient, less expensive and can cover vast stretches of the ocean floor. Once we commit our new robotic devices to the deep sea, we won't have to bring them up. So you get 24 hours of productive labor out of the vehicles, instead of the usual three.

"Working with the National Geographic Society and Turner Broadcasting, we will begin transmitting our live marine adventures on May first of this year." —Ballard

Thousands of people can also participate in a dive, through live satellite broadcasting back to base units. That's exactly what we're doing in the Jason Project later this spring.

Jermaine: What is the Jason Project?

Ballard: The initial purpose of the project was not so much fundamental exploration and archeology (which will definitely take place), but to motivate young people and get them excited about science and technology. We want to take them on a journey of discovery that they can participate in as it happens. Our first stop is an active volcano located near the center of the Mediterranean Sea. The area contains beautiful lava flows, fissures, hydrothermal deposits of minerals and unusual forms of animal life. So we're giving teachers the opportunity to take their classes on sort of a field trip to an active volcano beneath the sea.

The second stop is a human history site. Last summer, we searched the ancient trade routes for something unique. We found the remains of a Roman fleet in deep water, and it's just sitting there waiting for us. I'm really looking forward to exploring the site. And you can join us too. Woods Hole is currently building replicas of the control center we have at sea. They will be set up in museums throughout North America. Working with the National Geographic Society and Turner Broadcasting, we will begin transmitting our live marine adventures on May first of this year. There will be a total of 84 one-hour shows from these two important sites over a period of 14 days. About 14 million kids will visit our control centers during that time. We're also working with National Science Teachers, to develop special curriculum courses for school districts in those areas. When the Jason Project is over, we plan to produce a television special that will show you the highlights of the whole thing.

The following museums are participating in the project: The Franklin Institute (Philadelphia, PA), Rochester Museum and Science Center (Rochester, NY), Royal British Columbia Museum (Victoria, British Columbia), Science Museums of Charlotte Inc. (Charlotte, NC), Boston Museum of Science (Boston, MA), Museum of Science and Industry (Chicago, IL), Memphis Pink Palace Museum (Memphis, TN), National Geographic Society (Washington, DC), and The Science Place (Dallas, TX).

Jermaine: Why are you interested in educating children?

Ballard: First of all, I wish to prove that scientists are not nerds or at least the new emerging scientists are not nerds. We want to create a role model that kids will try to emulate. This could eventually improve the state of scientific and technical literacy in the United States. Woods Hole has approximately 130 graduate students in all fields of oceanography and ocean engineering. Right now, the vast majority of the physics and engineering students are from foreign countries. That's crazy. America is training the competition at taxpayers' expense. Then they go home, and we meet them in the marketplace where we're already losing.

It's not that we should lower the standards of our universities to admit more American kids, but we should raise the quality of American children. And that can only be done by motivating students at the junior high and high school level. You can't order them to get excited about anything. Once you create a telecommunication center, kids can use it to go anywhere in the world and see it live. In the future, we plan to take them to Herculaneum, Pompeii, the pyramids at Giza, and possibly even Luxor in Egypt.

Jermaine: Getting back to oceanography, has it changed very much from the time you left college?

Ballard: When I went to school at the University of California, we didn't even know the average depth of the ocean. Our knowledge was very primitive in those days. Certainly the evolution of plate techtonics, and the new global look at the earth (which I participated in as a graduate student and young scientist), was a major revelation in the sixties and seventies. Twenty years ago, we thought the human race was nothing more than a passenger on the back of a giant organism. It's really not a living breathing thing, but a fragile life support system we need to stay alive.

"We've reached a point in the last few years where humans can actually kill the planet. And we've begun to do just that." —Ballard

We've reached a point in the last few years where humans can actually kill the planet. And we've begun to do just that. No matter what mankind does, the earth will survive. It's a question of whether we will survive or life as we know it survives, when people destroy the oxygen-generating portion of the world (like the Amazon rain forest, for example). The global warming trend, sometimes called the "greenhouse effect," is not as troublesome to me as the depletion of the ozone layer. The rise of sea level will cause inconveniences, but it certainly won't be life threatening like the latter. Pollution is definitely the worst problem we face today. People are poisoning the water table and gradually destroying life in the sea. So the main goal of oceanography is not to locate things like the *Titanic*, or even to explore the ocean depths. We need to learn more about our life-support system and make sure it isn't turned off.

In conclusion, I'd like to thank Dave Gallo, Shelley Lauzon, and Angie Niehoff for their contributions to this feature. I hope we can work together again real soon. ■

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read in an ad. But when such false judgments of software are made (based on beta software) it hurts not only the potential buyer but the developer as well. The developer is hurt because his market is reduced, and the would-be buyer may avoid the exact software package they want or need simply because a pirate didn't like the buggy beta version of the program he or she stole.

Those who dip into the questionable waters of pirated software risk virus infection each time their disk drive whirs.

Viruses and Software Piracy

You don't have to be a computer owner to be aware of the computer virus epidemic which is threatening every system in the world. The spread of these disk killers has escalated so quickly and poses such an electronic threat to us all that both *Business Week* and *Time* (not to mention trade journals) featured the problem in cover stories last year. I think it is safe to say that undetected, viruses pose the greatest single threat to any software owner. Fortunately, thus far every time a virus has been identified, a cure has quickly followed. Let's look at where the viruses come from and why they spawn.

In their September 26, 1988 issue, *Time* reported that one of the earliest identified viruses was developed and spread by two disgruntled software sellers. The distributors (brothers) admitted they had inserted the virus into disks they knew would be pirated to "punish" pirates for buying and selling "bootleg software." The story went on to estimate that nearly 3000 computers are infected by some sort of virus every month. Anyone who has fallen victim to the damage such an infection can wreak on a software library will appreciate the seriousness of those numbers.

Just like human infections, computer viruses are spread by contact and are more easily avoided than combatted. Let me ask you this: if you thought a source of water might be contaminated with the typhoid germ would you drink it? Of course not. Yet those who dip into the questionable waters of pirated software risk infection each time their disk drive whirs. But in the past 12 months I have heard of only one case of a virus being detected on a program disk distributed by a legitimate software distributor (it was quickly recalled and eliminated). All those nasty software bugs which have plagued thousands of Amiga users lately have arrived, not with warranty cards, but on pirated software. The tragedy of viruses is that once they are introduced to your software library, they can't tell the difference between pirated and legal software. And unless proper house cleaning is observed, in time all your disks could be infected or damaged.

Like it or not, software viruses are a fact of computer life in 1989. And as is true with any disease, the best solution to this threat is to avoid contamination. If you avoid pirated software your chances of infection decrease by at least 99 percent. The threat of computer viruses is forcing many would-be pirates to rethink their approach to software collecting. Some former pirates admit their software appetite has been decreased if not fully curbed by the threat.

The protective shield offered by the fear of viruses has not gone untapped by some software developers. At one Amiga users meeting where virus detection and eradication were being explained, a visitor offered an obviously pirated disk to be tested. Although the disk was not infected, the boot block (where most Amiga viruses live) had been altered by the software developer to appear to hold a virus—apparently in an attempt to discourage theft of his beta tested work. As far as I know the bluff worked; no one I saw at the meeting even suggested they would be interested in a copy of the questionable disk.

Protection Schemes, Generous Pirates and Cost

I don't know of anyone involved with computers who doesn't hate copy protection schemes. And when the dust has settled from all the arguments pro and con, it is the honest buyer who is usually hurt most. The argument over software protection reminds me of the unending disputes about gun control. Just like that debate, the fellows on the shady side of the copyright laws are always going to have backups of their software and the innocent one on the other side must go without. They are the ones who have to risk damage to their original. Thus, software protection is not so much a deterrent as a holding action. Most software developers recognize that sooner or later the pirates are going to break any protection scheme. The hope then seems not so much to stop the pirates as to delay them long enough to make a profit.

The fact is that in the long run protection schemes are just pointless expenses for both the developer and the buyer made necessary by pirates. Four years ago protection schemes were accepted as annoying but necessary evils. But with the increasing interest in hard drives, copy-protected software has become a albatross for the user as well as the distributor. Hard drive owners want to put their software collection on these fast disk—usually an impossible feat with protected software.

The argument over software protection reminds me of the unending disputes about gun control.

Recognizing the need to rethink their protection schemes, many software developers are dropping protection entirely—showing a trust in their customer they had reserved in the past. Others are simply changing the way they protect their investment. This change of direction is probably more evident to Amiga users than to 64 and 128 users. Of all the new protection schemes (like look up a word in the manual, hardware dongles, coded dials and photocopy resistant paper), most users I've talked with prefer the "look up a word in the manual" approach. The protection scheme they seem to dislike the most was the use of a hardware dongle, which most said they feared losing. But thankfully, all the new schemes allow you to make backup copies of your software.

Two new protection schemes which I personally dislike the most involve color. In theory they sound sensible, you simply look up the coordinates on a map, page or box cover and feed the information into the program. The map which comes with Electronic Arts' *Skyfox II* is printed with dark blue ink on paper almost the exact same color and is a good example of such a scheme. I understand the theory—it would be nearly impossible to photocopy—but in use, under normal room lights, I had trouble distinguishing the passwords from the background.

The people at Psygnosis came up with one which is even worse. To get into *Chrono Quest* you have to overlay a wax paper grid over the cover and then identify the color beneath the coordinates. It has been my experience that the wax paper makes it hard to tell gray from blue, it is

easy to align the overlay crookedly, and more often than not, the chosen block contained more than one color—which one is right?

But at least copy protection is beginning to end. And if we users do our part, the companies should follow suit with less expensive packages (due to increased sales), no copy protection (or at least friendlier schemes) and demo disks which give the user the chance to test a product without having to risk hard-earned money on untried programs. The bottom line is there are no free meals—use the programs you like, but pay for them first.

No industry, including software publishers, can absorb massive theft of their products indefinitely.

No industry, including software publishers, can absorb massive theft of their products indefinitely. I hope those who are robbing the programmers, developers and distributors will rethink what they are doing and simply reject software piracy. If software companies can be assured a fair return on their investment, and the free market works like it is supposed to, an end of piracy should bring increased quantities, the end of disk-controlled copy-protection schemes, improved quality and lower retail prices.

"If sales increase, prices can come down. Yes, if pirating were non-existent, more units would be sold, and prices should fall accordingly," said Fred Schmidt, vice president, business development at ORIGIN. "When fewer units are sold, someone has to foot the bill for research and development cost. It is not the pirates, it's the legal user who pays. I don't like that fact, you don't like that fact, and I'm sure the good fellow who buys our programs doesn't like that fact."

Testware: Hope For An Industry?

I suspect such incidents of "honest pirates," like the fellow above who tests bootleg copies before buying, are rare. But by the same token, I'm sure all of us have faced the same dilemma—how to decided which program to buy from the dozens or hundreds to choose from, without deflating our retirement fund buying them all? "Testware" could be the solution, and some software distributors are already offering such programs. In the past year I've received several CAD programs and databases which allow the user to try some of their program's features to fairly judge it before buying. I think this is a great solution to the would-be buyer's dilemma and hope more software developers will join the trend.

Many game developers are also offering demos of their programs so their customers can at least see the graphics and hear the sound effects of games. But unfortunately, none I have seen allow the user to actually play a level of the game. Such limited-play versions should be made more widely available in the future. Just as some auto manufacturers offer $1 demo disks to promote their products, I think the software manufacturers would be wise to follow suit. I think most of us users would be delighted to pay a buck to test a new program. And if the developers really wanted to be fair, they might offer a rebate to testers who sent in their testware with a check to buy the finished product. If nothing else, testware would eliminate the argument that software pirates just want a peek of the software, not a free ride.

Cracking Down On Software Pirates

Why don't the software developers crack down? In the past five years I've talked with marketing personnel of most of the developers of software for Commodore computers about the piracy problem. And all agree that piracy is a serious problem which must be faced with legal action. At present the chosen targets are large dealers rather than individuals (consistent with the way law enforcement agencies prefer to go after major drug dealers rather than nickel and dime operations).

Which operation they'll go after next I don't know, but from some of the pirate operations I've gotten reports about, it should not be a matter of which one but when the ax falls. Some pirate bulletin boards and "dealers" are so blatantly unafraid of prosecution that they actually advertise with underground leaflets, complete with toll-free phone numbers. Part of the reason software companies have been hesitant to prosecute pirates is the fact that many are also paying customers, and no industry wants to attack their market.

"We won't be able to eliminate 100 percent of software piracy," said William Cleary, president of his own software marketing and design company, "but piracy is a problem we must begin to deal with. It is a real problem." Part of the way software developers are beginning to fight the battle against illegal copying and distribution of their wares is through the Software Publishers Association.

At present the Washington-based SPA is the leading edge in the fight against pirates. Jayne White, a project director with SPA admits they are facing a long war but says some battles have already been won. Recognizing that the most profitable approach to battling any illegal activity is to go after the kingpins first, the association has concentrated on corporate and retail piracy, and as you are reading this they're taking more cases into court. White says their next offensive objective is to shut down all those Sysops who list copyrighted software on their BBS's. They are even offering reward money to anyone who will help them catch a pirate board. If you know of any bulletin boards actively porting pirateware, you can help (and earn $50) by sending the SPA their names, addresses and phone numbers. White also ask that you supply them with a list of the commercial software you saw posted there, along with a password so they can log on and confirm your information. Contact the Software Publishers Association at: 1101 Connecticut Ave. NW, Suite 901, Washington, D.C. 20036.

"Testware" could be the solution to software piracy, and some software distributors are already offering such programs.

Piracy is a real problem which threatens the health of every computer user's investment. And from what I've seen and heard, the incidence of software piracy is increasing. Software piracy which was the casual crime of the '80's could actually threaten the survival of the software industry in the '90's. Unless piracy can be curbed, the future development of safe, quality software is in question.

With all that said, I have the uncomfortable feeling I will be receiving some hate mail from people who would prefer the status quo, and I may receive some cool receptions in future user meetings. But along with most computer users, I want to see the flow of quality programs for the systems we use continued. The only way we can guarantee a healthy software industry is by practicing self control. Generosity is a virtue—stealing is not. ■

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game clock ticks along without any pause in the action and allows you to enter orders on a continuous basis.

A key issue that every game system needs to address is that of viewpoint. The player's viewpoint or perspective shapes the play of the game, as it determines the nature of the decisions you will be called upon to make. Some games sharply delineate viewpoint and limit your responsibilities strictly to those areas that would fall under the jurisdiction of the command position you are considered to occupy.

For example, in *Seventh Fleet* (SC) you play the part of the American or Soviet theater commander. This role charges you with the responsibility of organizing and assigning missions to naval task forces, but such matters as the composition of air strikes remain the concern of lower-level officers. Keeping with its portrayal of viewpoint, the game also imbues subordinate commanders with wills of their own so that they may at times alter or ignore a direct order on your part.

On the other side of the coin are those games that adopt multiple viewpoints. Simulations of this sort supply players with several command hats to don. Thus, in *Battle of Antietam,* you essentially perform the duties of the commanders at the army, corps, division and brigade levels. Neither approach to viewpoint is necessarily more valid. Games that limit you to a single leader's perspective offer a more authentic picture of the problems and challenges that confronted the historical commander.

But while a simulation with shifting viewpoint sacrifices some realism, it also lets you participate in the experience of command at many different levels. Books on military history often examine a battle, campaign or war through the eyes of the foot soldiers in the ranks on up to the generals at headquarters; there's no reason a game shouldn't take a similar approach. The final part of this discussion brings us to the actual mechanics of play. When I speak of mechanics, I am referring to not just movement allowances and combat algorithms, but everything else related to the way a game simulates the interaction of hostile forces on a field of battle. The function of the game system in this regard is to reduce the manifold complexities of war to a set of principles that players can understand and manipulate. The game system also imposes a structure on events in the form of a sequence of play, which specifies the order in which movement, combat and other actions take place in the course of a turn.

It is through the game's mechanics that the designer gives concrete expression to his vision of his subject. Creating a war game is very much a selective process: the designer must pick and choose those factors he judges to have influenced the historical battle and incorporate them into the design. Thus, the mechanics of play represent the results of the designer's evaluation.

> While an arcade game might test your quickness and dexterity, a war game presents an intellectual challenge, very much in the spirit of chess.

To illustrate this point with a small example, consider the treatment of ammunition in *Shiloh* and *Decisive Battles of the American Civil War.* In *Shiloh,* every brigade carries a limited supply of ammo, which once depleted gets replenished at a variable rate; *Decisive Battles* ignores the question of ammunition altogether. The mechanics—or lack thereof— governing ammo expenditure reflect the designers' views of the role this matter played in the outcome of the real-life battle. Continuing with the above example, the two games resort to different sets of mechanics even when simulating the same concept. Both titles place heavy emphasis on the problems of communication among commanders in an era before the invention of the telegraph or radio. With *Shiloh,* a brigade's distance from its divisional and corps leaders affects the number of operation points it receives each turn. As every action a brigade performs costs a certain number of operation points, a unit in close contact with its leaders can therefore do more than one that is further away.

Decisive Battles also uses distance—as well as a number of other considerations—as a prime factor in calculating command control. However, communications are judged in all-or-nothing terms: a leader is either in communication with a particular subordinate officer or not. Those subordinates out of touch with their higher-ups are ineligible to receive any new orders until contact is reestablished. In the meantime, each officer will simply continue to act upon the last set of orders transmitted to him.

Incidentally, it's interesting to note the way in which these mechanics tie in to each game's portrayal of viewpoint. In *Shiloh,* where you play a number of command roles, you always retain some control over your units, no matter how fouled up your communications become. In *Decisive Battles,* where you represent a single leader, the absence of communications effectively isolates you from the units under your command.

Shiloh and *Decisive Battles of the American Civil War* make interesting studies in contrast as to how war games attempt to model history. Each game applies a different set of mechanics to serve the same goal, that of providing an accurate, tactical-level simulation of the Civil War. One might also add that the games are far apart in viewpoint and format; in other words, what we have on display here are two very different game systems.

Principles of Play: Offensive and Defensive

As the name suggests, war games simulate strife, the struggle of two forces in direct opposition to one another. Typically, a game will cast one side in the role of the aggressor and the other in the role of the defender. The player charged with conducting the attack must assume an active stance in the game, forcing the action with the overall purpose of altering the situation as it exists at the start of the battle. In most cases, the player on the offensive is seeking to seize territory currently under the enemy's control, destroy his opponent's army, or accomplish some combination of both. The player on the defensive seeks just the opposite. He wants to maintain the status quo, preserving his territory and troops, while inflicting some damage on his opponent.

The attacker usually enjoys two key advantages over the defender: a superiority in strength and possession of the initiative. The attacker's greater numbers means his army is more powerful, flexible, and better able to absorb losses without having its fighting abilities impaired. In a game like *Road to Moscow,* the German player has so many units at the start deployed along so narrow a front that he lacks space to attack with all of them. The widening of the front coupled with the casualties both sides incur with the passage of the weeks therefore works in the German player's favor: he has plenty of troops to make good his losses, while the defending Russian army grows ever more brittle as it attempts to cover a longer line with fewer men.

The attacker's firepower advantage also secures him the initiative, since the defender lacks the strength to do more than respond to his opponent's overtures. Control of the initiative allows the attacker to dictate the pace and progress of the battle. He has the luxury of choosing when to attack and where. Assuming the defender's troops are arranged in some sort of battle line, the attacker can assault selected points along that line and ignore the rest. This concentration of force lets the attacker make maximum use of his assets while leaving parts of the defender's army idle, further magnifying the disparity in strength between the two sides.

The defender's role is obviously the more passive one. The defender must play a waiting game, one of deploying his forces and then sitting quietly until the attacker tries to expel the units from their positions. His greatest ally is the terrain of the battlefield. The protection afforded by terrain features such as forests and rivers decreases the effectiveness of attacking units and thus to a degree nullifies the offensive player's strength advantage. Most game systems work to provide other intrinsic advantages for the defender as well. In *Rebel Charge at Chickamauga*, for example, brigades about to be attacked in melee may conduct an extra defensive fire before the assault is resolved.

Additionally, while the attacker retains the initiative, the defender has the power to influence if not determine the ground over which the battle will be fought. In the Crete scenario from *Battlefront*, for instance, the Allied player can abandon the open area around Maleme Airfield and instead make his stand around the rough and mountain hexes in the vicinity of Galatas, forcing the Germans to attack where the terrain is at its most unfavorable. The judicious application of reserves is another way the defensive player can offset his attacker's numerical superiority. By keeping a few units back until the attacker commits himself, the defender can then send his reserves to bolster the threatened areas.

Although most games start with one player taking the offensive and the other assuming the defensive, subsequent events may sometimes bring about a reversal of roles before the battle's end. In some cases, this turning of the tide will occur at a clearly defined juncture in the game.

For example, in *Shiloh*, the first day of battle closes with ten brigades of Union infantry arriving at nightfall, swinging the balance of forces in the Union player's favor for the second day. In other instances, however, the shift in players' roles is a more subtle process.

In *Russia*, the steady stream of reinforcements the Russian player receives may or may not put him in the position to launch a winter counteroffensive in 1941/42, depending on the level of losses both sides have suffered. Even if the Russians launch a full-scale attack, the coming of spring in 1942 should still see the German player ready to renew his own offensive. So, over the course of the war, players may experience several turnarounds, or possibly none at all.

For players in either role, the decision of when to switch over to the offensive or defensive is fraught with peril. The attacker who continues an assault in the face of an enemy no longer his inferior risks crippling his army. By the same token, the defender who fails to take up the offensive banner soon enough may leave himself with insufficient time to recover the ground he has lost.

> In formulating strategy, you need to figure out how to apply the resources at your disposal so as to have the best chance of fulfilling your victory conditions.

Players in both positions need to make careful assessments of the current situation and the capabilities of their forces, exercising care not to let emotion cloud their thinking. By far, one of the hardest realizations to accept is that your army must surrender the initiative and revert to the defensive. It requires you to shift gears psychologically and fight not so much for victory but more to avoid defeat. Not surprisingly, some of greatest disasters in military history have transpired as the result of one side's refusal to admit the failure of its offensive and go over to the defensive.

Principles of Play: Tactics and Strategy

Webster's New World Dictionary defines *tactics* as "the science of arranging and maneuvering military and naval forces in action . . . especially with reference to short-range objectives." The entry for *strategy* reads: "the science of planning and directing military operations." Tactics and strategy come into play in computer war games of all stripes, regardless of subject or level. Even the most tactical of games like *Computer Ambush* requires players to give some thought to strategy. Figuring out how to neutralize an enemy machine-gun firing from an upstairs window is a question of tactics. But if you place that intended action into a context—you want to eliminate the gun so your squad can cross the street, circle around the enemy-held building, and attack it from the rear—then you have entered the realm of strategy.

Although I'll be discussing tactics and strategy on a separate basis, bear in mind that the two subjects are closely linked. Victory in any game requires equal parts good tactics and good strategy. The equation is incomplete if one or the other is lacking. Faulty tactics will sabotage the best of strategies, just as surely as an ill-conceived strategy will negate the advantages won by sound tactics.

The tactics you use in any particular war game are very much the product of its game system. The game system is the medium through which the opposing forces—and the players directing them—wage battle. So it stands to reason that tactics, concerned as it is with the nitty-gritty of movement and combat, should derive directly from the mechanics governing the game.

For instance, in *Halls of Montezuma* (SSG), units may conduct four kinds of attacks: Probe, Prepare, Assault and Exploit. Each variation works best under a different set of circumstances. Thus, tactics in the game for the offensive player partly become a matter of juggling the four attack types and picking the best moments to use each. Of course, *Halls of Montezuma* takes a lot more into consideration when determining the outcome of a battle than simply attack mode. The computer also weighs the strength, experience, leadership and fatigue of the units in combat, the type of terrain the defender occupies, levels of air and artillery support, and combined arms modifiers. The key to good tactics in any game lies in understanding how these sorts of factors interact and in learning how to manipulate them to your advantage.

As an offshoot of the above, it pays to be aware of any odd feature of the game system that, while perhaps lacking a basis in history, may nonetheless have an important impact on play. The stacking limits in *Crusade in Europe* (MicroProse) neatly illustrate this point. The game allows no

> The subject of tactics arises once the game gets underway, but the larger issues of strategy should be settled before the first turn begins.

more than one unit (regardless of size) to occupy a hex and prohibits friendly units from even passing through each other during movement. These restrictions can lead to all sorts of traffic snarls at the front; in some circumstances, a unit that is boxed in by friendly troops to the rear and forced to retreat will simply surrender instead. The player has every right to cry foul in such a situation, but of course it's the game system that serves as the sole arbitrator of "reality" in the simulation. The only recourse left in the above example is to heed the consequences of the rules and always maintain a little open space between your units on the front line and those to the rear. In other words, you need to adapt your tactics according to the dictates of the game system.

While tactics are a function of the game system, strategy is tied to the game's victory conditions. The victory conditions specify your objectives in the battle: usually the control of designated areas on the map, the elimination of enemy units, or often some combination of the two. Strategy must be tailored to meet these objectives—perhaps an obvious point, but one worth stating nonetheless. During the course of a game, it becomes all too easy to lose sight of your victory conditions and instead start to focus on defeating the enemy troops in front of you to the exclusion of everything else.

Napoleon in Russia serves as a particularly good example of a game in which the unwary player can fall prey to this sort of tunnel vision. Most of the fighting in the game centers around a series of fortifications defended by the Russian Army. Yet, the game measures victory or defeat solely on the basis of the losses suffered by the French and the Russians. The French player who forgets this fact in his enthusiasm to wrest control of the fortified positions from the Russians may end up accomplishing his plans for their capture but still losing the battle. In formulating strategy, you need to figure out how to apply the resources at your disposal so as to have the best chance of fulfilling your victory conditions. For the offensive player, this means resolving such questions as which objectives should I strike for, what forces should be committed to the different axes of attack, and what sort of timetable of advance should be followed. The defensive player faces a similar set of questions but phrased in different terms: where should my forces make their stand, how should they be deployed, and when and under what circumstances should I retreat?

In both cases, you are trying to arrive at a coherent plan of action for the battle, a systematic approach to reach some desired end. The player who acts blindly according to the demands of the moment without a guiding sense of strategy risks squandering his troops in a series of wasted moves. Likewise for the player who never clearly establishes in his mind the goals he is out to achieve. The subject of tactics arises once the game gets underway, but the larger issues of strategy should be settled before the first turn begins.

Maximizing Your Enjoyment

Near the beginning of this article I likened war games to chess insomuch that both offered the same sort of intellectual challenge. And it's very possible to enjoy playing a war game exclusively in this regard, as an activity that lets you test your skills in a mental sparring match of sorts. War games are designed with competition in mind, hence the prevalence of such features as handicap or difficulty levels, the sole purpose of which are to provide players with a tool to ensure a balanced contest. The stakes are modest; yet anyone who has ever played a war game can attest to the distinct thrill of pleasure that comes with victory, or the genuine rush of disappointment brought on by defeat. A war game indulges your competitive instincts this way, engaging your mind while tickling your emotions.

But unlike chess and most varieties of computer games, war games also aspire to a larger purpose. A war game seeks to provide its players with a dynamic model of a real or hypothetical event. The extent to which you can appreciate this bit of technical wizardry, however, depends on your own grasp of the subject the game is simulating. In the absence of any understanding of the event on your part, the symbols and information the game splashes across the screen remain little more than abstract images and notations. They acquire a real meaning only through your comprehension of what they are meant to represent.

Your awareness of the circumstances of the battle also adds a layer of significance to what transpires during play. Knowing that the Confederates' failure to seize Cemetery Hill may have cost them a victory at Gettysburg, for instance, invests your own decision to attack or bypass the hill in SSI's *Gettysburg* with a fascinating historical dimension.

Many games have taken to including detailed historical commentaries in their rule books. A trip to the library will also quickly educate you in all of the whats, whys and wherefores of a particular battle. No matter how you acquire the knowledge, you'll find that the better informed you are when sitting down to play a computer war game, the more enjoyable—and rewarding—the experience becomes. ■

Companies Mentioned

Avalon Hill Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300
Gulf Strike
Wooden Ships and Iron Men

DataSoft
19808 Nordhoff Place
Chatsworth, CA 91311
(818) 886-5922
Napoleon in Russia

Game Designers' Workshop
Distributed by: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
The Road to Moscow

Garde
8 Bishop Lane
Madison, CT 06443
(203) 245-9089
Blue Powder, Grey Smoke
High Seas

MicroProse
180 Lakefront Drive
Hunt Valley, MD 21030
(301) 771-1151
Conflict in Vietnam
Crusade in Europe

Simulations Canada
P.O. Box 452
Bridgewater, Nova Scotia, Canada B4V 2X6
Fall Gelb
Golan Front
Seventh Fleet
Siege in Africa

Strategic Simulations, Inc.
1046 North Rengstorff Avenue
Mountain View, CA 94043
(415) 964-1353
Battlegroup
Battle of Antietam
Battles of Napoleon
Broadsides
Computer Ambush
Gettysburg
Knights of the Desert
Operation Market Garden
Panzer Strike
Rebel Charge at Chickamauga
Shiloh, Grant's Trial in the West
USAAF
War in the South Pacific
Warship

Strategic Studies Group
Distributed by: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 571-7171
Battlefront
Carriers at War
Decisive Battles of the American Civil War, Volumes I, II and III
Europe Ablaze
Halls of Montezuma
Russia, the Great War in the East
Strike Fleet

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Although you may not win any medals, it's sure to bring some chuckles. Failing to rotate fast enough, for example, will cause the chain to wrap itself around the athlete's body, the hammer bonking him on the head. Painfully funny.

Release too soon and the hammer appears to fly right off the screen. (Simulated cracked glass would have been the perfect effect.) Release too late and you'll make a hole in the safety fence. Fail to let go at all and you'll find yourself airborne.

Despite this comedy of errors, a perfect throw remains a sight to behold. The perspective shifts downfield as the hammer lands with a thud, leaving a mark in the glass. Off in the distance, the proud contestant jumps about joyously.

The key to this event is perfect timing and sheer luck. Exact timing, however, is nearly impossible due to the speed of the spin.

Hurdles

This one- or two-player head-to-head event also relies on excellent animation, humor and speed to create a nerve-wracking good time.

Players compete in a 400-meter run lined with ten barriers. Precise joystick control is essential to complete the race. Using the familiar rhythm method, players move the joystick in time with their runner's legs. Press the fire button to leap approaching hurdles.

Jump too late and you'll crash about knee level into the wooden barriers. Such a spill usually ends the race for a player. Jump too soon and you'll knock over the hurdle, stumbling afterwards. Move quickly to recover in time for the next jump. It's possible—but highly unlikely—to knock down all ten hurdles and still finish the race.

The most difficult aspect of this event is coordinating two skills: a fast, even stride and precise jumping. For less ambidextrous players, try a "pistol grip" joystick for a more tactile response.

Pole Vault

Eye-pleasing graphics and flawless player controls highlight this easy-to-learn contest. Players begin by adjusting the crossbar height. In competition, you have three attempts to clear one height before moving higher.

The event kicks off with your athlete's head-on approach to the uprights, rendered in eye-catching 3D animation. As the pole enters the vault box at the end of the run, player perspective switches to a side view. Push up when the pole bends for maximum lift, then right at the apex to twist over the bar.

When all the elements click—speed, strength and timing—your contestant lands safely on the mat and gives an ecstatic back flip. Push off too soon and you'll crash into the bar; too late and your pole breaks in half from the weight.

Rings

Strength and finesse combine perfectly in the Rings, one of the most physically demanding Olympic sports. Likewise, the design here is ingenious, complimented with excellent graphics and fluid animation.

Success on the rings involves a mastery of moves and holds through sheer physical strength. Moves are made by rapidly tapping the joystick up/down or left/right. The rhythm of the joystick movement also determines how well you maintain each position. There are 11 hold positions, but a wide variety of moves in and out of each hold.

As in the diving event, players are allowed to write their own routines here. Points are scored for execution, difficulty, combination moves, originality, virtuosity and risk. Skilled players will find this event particularly amazing.

Uneven Parallel Bars

This is by far the most complex event ever attempted in the Epyx *Games* series. Featured here is an incredible array of 23 moves and four difficulty levels. Unfortunately, not all aspects of the event come together. The animation is jerky and the graphics highly uneven (pardon the pun).

Four modes of play are available: competition, demonstration, practice and slow (motion) play. Slow play is great for studying combination moves during demonstrations. Actual competition moves so quickly, in fact, it's difficult to distinguish one move from another. Falls are met with a resounding "phwomp!" Looks and sounds very painful. This one has the most potential of any event, but is just not as smoothly executed on screen as it is on paper.

Conclusion

The Games: Summer Edition definitely ranks among the best in the series. Only one event in eight fails to meet expectations—an incredibly favorable percentage. Coupled with the most intelligent and detailed instruction manual yet, you simply can't go wrong.

Amiga Public Domain

Continued from page 86

appeared in the public domain at press time, the grand prize winner Charon has been released, and that will be one of the featured reviews in next month's column, along with some other great animations.

I can be reached on the AmigaZone on PeopleLink (ID: G KINSEY), or on the IDCMP BBS (617) 769-3172 (300/1200/2400 baud, 105 MB online, running 24 hours a day), addressed to SYSOP. If you have written a public domain/shareware-/freely distributable program or have obtained one that you think is worth mentioning to all Amiga owners, please attempt to contact me via the above, or through *Commodore Magazine*. See you next month.

***Fish disks:** For a catalog, send a SASE and four loose stamps or $1 to: Fred Fish, 1346 W. 10th Place, Tempe, AZ 85281.*

To sign up to PeopleLink and their AmigaZone, call them at: (800) 524-0100 (voice) or (800) 826-8855 (via modem).

For information on other programs mentioned, write to SMAUG, c/o 1015 S. Quincy, Apt. 112, Quincy, MA 02169.

Book Reviews/Quest for Clues

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shape of the land and approximate locations of key places. Mazes are shown in overhead views as you would see in a puzzle book.

Another shortcoming of the book is that the solutions offer only one set of possibilities for the games. However, there may be many ways to finish a given game. It would be impossible to take all scenarios into account in a comprehensive book like *Quest for Clues*. In those cases where you are looking for an answer to a very specific question, it might be a good idea to get the clue book published by the game's designer. Those books will answer every question. For the purpose for which it was intended, however, *Quest for Clues* does an excellent job.

I would recommend this book for the die-hard adventurer who is stuck on one of the more recent games and wants a quick answer. But *Quest for Clues* is more than just a hint book; it is an introduction to a variety of games for adventuring newcomers. You also get a coupon for a trial subscription of three issues to *Questbusters* with the book. Now, excuse me while I go kill those orcs in the pasture just over the hill.

Continued from page 15

```
51 DATA 162,101,160,250,236,020,003,
   208
52 DATA 013,204,021,003,208,008,169,
   001
53 DATA 133,170,162,031,160,019,120,
   142
54 DATA 020,003,140,021,003,088,096,
   173
55 DATA 000,220,041,031,073,031,162,
   145
56 DATA 201,001,240,026,162,017,201,
   002
57 DATA 240,020,162,157,201,004,240,
   014
58 DATA 162,029,201,008,240,008,162,
   013
59 DATA 041,016,201,016,208,017,230,
   170
60 DATA 165,170,201,005,208,009,169,
   001
61 DATA 133,170,142,074,003,133,208,
   076
62 DATA 101,250,001,049,003,234,083,
   119
63 DATA 084,002,086,198,088,049,089,
   234
```

64 Barrel Jump: This little game uses the PRINT statement to produce an interesting animated effect. We think the animation, sound and action work very well together here, and we hope your readers will agree.

By pressing any key, you cause the speeding motorcycle to jump the barrels that roll toward you on the road. Jump ten in a row, and you win the game. Be careful, winning requires perfect timing and nerves of steel, especially at the higher levels of play. Jumping too soon or too late both have disastrous results.

When typing the program, pay careful attention to the extra commas in lines 270–280; they are vitally important to the proper appearance of your motorcycle.

Bob and Dave Snader
Baltimore, MD

```
100 T$="[CLEAR,RVS,YELLOW,SPACE6]
    64 BARREL JUMP - THE SNADERS
    [SPACE6,RVOFF,WHITE]"
110 POKE 53269,0:PRINT T$;"[DOWN4,
    SPACE2]PRESS ANY KEY TO JUMP THE
    BARREL."
120 INPUT"[DOWN3,SPACE2]
    LEVEL OF PLAY (1-4)[SPACE2]1
    [LEFT3]";LP
130 S=54296:V=53248:POKE V+32,5+2*LP
    :POKE V+33,14
140 PRINT T$:FOR J=832 TO 870:READ K
    :POKE J,K:NEXT
150 FOR J=0 TO 3:READ A$:T$(J)=A$:NEXT
160 POKE 55936,14:A=0:B=8:D=1703:Y=173
170 POKE V+21,1:POKE 2040,13
    :POKE V+39,0:POKE V,X:POKE V+31,0
    :POKE 214,12
180 PRINT:FOR X=40 TO 239 STEP 2
    :FOR T=0 TO 3
190 FOR R=0 TO 9:PRINT T$(T);:NEXT
    :PRINT"[LEFT,UP]":F=F-1
    :IF F=0 THEN Y=173
200 POKE D,81:POKE D+1,32:D=D-1
    :IF D<1664 THEN D=1703:A=A+1
210 GET K$:IF K$<>"" AND F<0 THEN
    Y=165:F=B-LP
220 IF PEEK(V+31)<>0 THEN 250
230 POKE V,X:POKE V+1,Y:POKE S,15
    :POKE S,0:NEXT:NEXT
240 PRINT"[HOME,DOWN3] YOU'RE A
    WINNER! YOU JUMPED";A;"BARRELS."
    :PRINT:GOTO 260
250 POKE 2040,0:PRINT"[HOME,DOWN3]
     YOU CRASHED AFTER JUMPING";A;
    "BARRELS!":PRINT
260 END
270 DATA 0,12,,,30,,,126,,,248,,3,255,
    ,127,236,128,61,127,192,66,191,
    188,153,93
280 DATA 50,189,122,73,153,244,73,66,
    56,34,60,,28,"[SHFT C3,SHFT +]","
    [SHFT C2,SHFT +,SHFT C]","[SHFT C,
    SHFT +,SHFT C2]","[SHFT +,SHFT C3]
    "
```

Storing Integers in Machine-Language Programs: Use this formula to find the number of bits needed to store a decimal integer X:

N = INT(LOG(X)/LOG(2)) + 1

It will show you that ten bits are needed, for example, to store a decimal 1,000 in binary form.

To find the largest decimal integer that can be stored in X bits, use:

N = 2↑X-1

As an example, it will reveal that a number as large as decimal 63 can be stored in six bits.

In either case above, if the binary integer can be positive or negative, you'll need an extra bit to store the sign.

John Ettinger
Warren, OH

CP/M Information Sources: One question abounds among 128 users: "How can I learn about CP/M?" The first step is to order the Digital Research manual that is advertised in your System Guide. It's a pretty complex book, but it's the most thorough and reliable resource for your version of CP/M.

Two books to browse in are *The Soul of CP/M* and *The CP/M Bible,* by Waite and LaFore. Both are published by Howard W. Sams.

In my experience, these magazines also give good coverage to CP/M: *Computer Shopper, Transactor, Profiles, Twin Cities 128* and *Micro Cornucopia. Computer Shopper* is very widely sold, and *Transactor* is usually available in well-stocked computer book stores. You may have to look hard to find the others.

Pamela Knapp
Calimesa, CA

CP/M Filetypes: The CP/M operating system allows optional three-character extensions to filenames. If a filetype is present, it must be separated from the filename by a period. The filetype is used to identify what sort of file it is attached to. It is similar in concept to the PRG, SEQ, REL and USR designations we see in the non-CP/M Commodore world, but has a far greater flexibility. Here are some of the more common filetypes and what they usually mean:

TYPE	MEANING
.ARC	Archived file; must be de-ARCed
.ASM	Assembler file
.BAS	BASIC program file
.COM	Executable file
.HEX	Program file in hex
.HLP	Help file
.LBR	Library file; must be delibraried with NULU
.LIB	Used by MAC and RMAC for libraries
.OVL	Program overlay file
.PAS	Pascal source file
.SUB	Command list for SUBMIT

You may encounter a filetype with a "Q" as its second letter. This signifies that it is a "squeezed" file, and you must use USQ-.COM to "un-squeeze" it before use. If you find one with a "Z" as the second letter, it is a "crunched" file. UNCR24.COM from CRUNCH24.LBR is used to "de-crunch" it.
Semaphore
Florissant, MO

SZAP Your CP/M Changes: Does a simple change to the CPM+.SYS file always require reassembling, relinking and regenerating a new CPM+.SYS? If you have a good file editor, the answer is a resounding "no." Depending on the nature of the change, you can often just dub it in with your file editor.

My favorite CP/M file editor is SZAP, which I use to zap in changes to my previously customized disks. It takes only minutes, compared to a regeneration process that may consume hours.
Pamela Knapp
Calimesa, CA

***Pocket Writer* and Interlace Mode:** If you own *Pocket Writer* for the 128 and have tried to use the interlace mode for displaying your document, you've seen how squashed and illegible the characters look. In fact, the mode is practically useless since the text is barely legible.

You can fix the problem by entering this line before you load *Pocket Writer:*

SYS 52684,8,9 : SYS 52684,3,5 <RETURN>

You might have to adjust the vertical hold on your monitor, since the screen is now "smushed." You'll notice that the characters are now smaller in the vertical direction, even without the use of interlace mode. I like them this way.

Once *Pocket Writer* is up and running, switch to interlace mode with [CTRL SHFT V]. You won't believe the difference!

Since some colors may cause the screen to flicker more than others, you may want to change the CONFIGURE file on your disk.
Brandon Corfman
Findlay, OH

Copy Holder: If you type programs from magazines like this one, you know how the magazine likes to flop around, unfold and slide off the desk. It's hard to position it so you can read the copy, and if you do, it won't stay put.

Radio Shack's #64-2093 "Helping Hands" device can keep your magazine under control. Similar devices are available in hardware stores and discount stores. They consist of a weighted base with two jointed arms terminating in alligator clips. To use such a device as a copy holder, fold your magazine to the desired page and insert it into the alligator clips. The base is heavy enough to prevent the magazine from moving, and you can swivel the joints to keep everything at the best angle for easy copying.

Your Helping Hands will also be useful as a third or even fourth hand if you have to do things like soldering ribbon cable to user port connectors.
Paul Follini
Amherst, Nova Scotia
Canada

Repairing Your Keyboard: If your warranty has expired and you find your keyboard acting up, you can probably take care of the problem with a set of small screwdrivers and a Commodore surplus keyboard, found at Radio Shack for about five dollars.

The surplus keyboard may not be wired like yours, but the keycaps and switches are ideal replacements for those on your 64. I replaced my old keys with new ones, got a better response from my keys and put that like-new feeling back in my keyboard. Because of the different color of the new keycaps, I ended up with a neat-looking effect, with my alphanumeric keys one color and my special control keys another.

Even if you don't replace any parts in your old keyboard, you can disassemble it and carefully clean the contacts, which frequently cures all your problems.
Robert Earle Perkins II
Wakefield, LA

Paper for Thermal Printers: With the exploding population of FAX machines in offices and homes, thermal FAX paper is increasingly available in stores. I've started using this paper in the thermal printer I use with my Commodore. It works great, and it costs less than half as much as thermal printer paper.

Also, when I make labels or disk directories, I use a roll of 4⅛" adding machine paper. The smaller size is more convenient for these specialized uses.
Douglas Jeffery
Telkwa, British Columbia
Canada

Supergraphix Gold Interface Tip: If you own this popular interface, you might think it doesn't work with certain software. In my own case, I couldn't get it to function with *geoWrite* or *Print Shop,* both very important programs to me.

As I was scratching my head in bewilderment, I remembered an addendum to my Supergraphix Gold manual, warning me that GEOS doesn't work in Supergraphix FAST mode and that I must force the interface to SLOW mode by entering:

```
OPEN 15,4,15
PRINT#15,"SL"
```

in direct mode.

Not only did this work for GEOS, but suddenly I was having no problems with *Print Shop,* either.

Perhaps other Supergraphix Gold users will find that some of their software requires the interface to operate in SLOW mode.
Susan Fenton
Meadville, PA

Pulse Mode Dialing: If you're having trouble dialing telephone numbers in pulse mode, try dialing at a lower speed or inserting pauses between the digits. Some telephone companies can't keep up with the rapid dialing of which your modem is capable.
John Ettinger
Warren, OH

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raised ring-side vantage, you move your surrogate across the canvas to meet his opponent head-on. Framing the ring on the top and bottom of the screen are two status strips. The lower strip keeps tabs on the round number, the remaining time, and the referee's knockout count should either boxer hit the deck. On top are the fighters' strength indicators, a pair of rectangular windows that change color as the players expend energy. Keep a watchful eye on these gauges, as they will usually dictate round to round strategy.

All offensive punches and defensive stances are controlled by simple joystick moves. Pressing the button puts you on the attack, with different controller positions initiating jabs, crosses, hooks, uppercuts and body blows. With the button released, you enter the defensive mode, allowing you to move right or left, as well as duck, cover up or lean back.

All this action is portrayed with exacting accuracy and smooth animation. Heads snap back in response to crushing jabs and uppercuts, with gut shots causing bodies to buckle in pain. The ring sounds might be a bit sparse, but the important audio highlights, like glove contact and crowd noise, are present and right on cue.

The participants swing, clutch, dance, hit, stagger and occasionally go down for the count. Between rounds, three judges' scorecards are displayed, showing which fighter they believe to be leading. Unlike their real-life counterparts, this trio appears to be an unbiased bunch, making it easy to check progress and adjust strategies without fear of an unjust ruling. When the bout ends, either by KO or decision, the winner's name is displayed, the crowd cheers, and in the case of a Tournament bout, the results are saved and ranking adjusted.

With arcade-like fight sequences and a realistic strategic foundation, this program packs one solid combination. Those familiar with Gamestar's original *Star Rank Boxing* release will find this sequel to be a more playable streamlined version. The graphics are a bit sharper, the animation more fluid, and the fighter control a lot simpler. This updated offering eliminates some of its predecessor's unnecessary offensive options, while adding a few of the missing defensive choices. The original game was good, but *Star Rank Boxing II* is better. Its full-spectrum approach successfully captures the feel and spirit of the sport, packaging it in a unanimous winner of a game. ■

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ness of the game. Your spinning sword is a helpful little tool, but you must know how to use it. By pressing the joystick button, a sword spins at your hands. In order to make that weapon useful, you have to time your attack. Don't step into the enemy (with the exception of Big Bosses)—let the enemy come to you! If you press the button a step or two before the creature is beside you, the sword will be wielded at the right time to make the creature disappear. If you develop your sword talents quickly, the rest of the game will be a breeze, except for the Bosses.

You only see a small part of the entire round's extents on the screen. It scrolls to the right as you move along, and sometimes you jump off one screen onto another—so be careful. Each creature you kill is worth 50 points toward your score, from the easy-to-dispose-of owls to the flying men who can deprive you of another chance at saving Princess Margo. In addition to the points for the many creatures you must fight, you get bonus points at the end of each round depending on how much time is left on the clock. If more than two minutes are left, you get 5000 points; between one and two minutes nets you 3000 points, and less than one minute increases your score by 1000 points.

Although strategy and joystick fluidity are essential to finishing *Kid Niki,* a good sense of humor is necessary to really enjoy all of the strange creatures in the rounds. One problem with *Kid Niki* is the lack of detail and development of the characters in the game graphically. The Commodore 64 has more power than Data East used to represent the various moving creatures. Instead, the graphics were reserved for the background scenery and strong emphasis is on game mechanics. But the lack of clarity in the pictures doesn't really make *Kid Niki* any less fun.

As far as adaptations are concerned, Data East has done a very good job with *Kid Niki.* Having never played the game in the arcade, I immediately went to my local mall after playing *Kid Niki* for a while and found the home version to be as exciting as the arcade quarter-eater. A nice touch in the Commodore version is the ability to continue your game on the current round after being killed three times instead of having to start over again. This is the icing on the cake for arcade fans who are looking for some quick satisfaction and a chance to escape into the luxury of your personal computer for a while. ■

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mat. A very useful storage option allows you to save any rectangular portion of the image as a Brush that can then be loaded into a paint program.

Other useful features permit you to "freeze" the palette, thus letting you digitize and display all of your images using the same color palette. While useful for smooth transitional effects in slideshow programs, the quality of the images could suffer considerably. You also have the ability to digitize an image without using color register 0 or 1. This is quite useful when you use the image in other programs which set the background and foreground colors (which are contained in registers 0 and 1) to specific colors.

There are two other important features which FrameGrabber provides: Animation and Automatic Capture. The animation function digitizes a series of images, and saves them sequentially in one special compressed ANIM file, rather than in a single file for each image. Since the ANIM file format is a standard, recognized IFF format, the pictures in this file can be displayed sequentially at high speed (using any number of available ANIM Player routines) to produce an animation effect.

The Automatic Capture function is similar to animation as it saves a series of images to a single file. It differs in that you can set the program to digitize an image automatically at specified intervals of time—up to one hundred hours. For example, by setting the delay time to two minutes and focusing a video camera on a flower that closes at night, you can create an animation of the flower slowly opening and closing. The number of frames you can capture, however, depends on the amount of memory in your computer.

As I mentioned earlier, the quality of the images was excellent. I was particularly surprised and pleased at how well moving images from videotape were captured and digitized without having to use the VCR freeze frame function. The manual is short, concise and thorough and contains instructions for programming the hardware for those interested in specific processing applications. While the price of FrameGrabber may place it outside the reach of the average Amiga user, anyone who has a need to create programs or slideshows using digitized images (particularly if those images are on videotape) will find FrameGrabber a worthwhile investment and a powerful addition to your Amiga. ■

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Hi-Res Screen Dump

With *Super Aide* you can do screen dumps of graphics and characters onto your printer. In addition to the hi-res screen dump, you can also dump just characters with the lo-res screen dump option. In any case, a hi-res screen dump is an important addition for those of you who like to get instant pictures of the screen without buying a plug-in cartridge. I used this option to take snapshots of the graphics my little program created.

Monitor Command Printout

In some cases, you may need the results of your commands in the ML monitor for later examination. In *Super Aide*'s ML monitor, you can have the output of every ML command go to the printer by preceding the command with an asterisk. I often used this option to look at different locations in memory while stepping through the program and to track register contents. By having the results right next to you on your printer, you can get more use out of the information.

Help Screens

Two NMI commands will call up the help screens for *Super Aide* commands. One help screen is for only the syntax error wedge commands, the other contains only the NMI commands. By using these help screens, you can get the information you need at any point in time by pressing the appropriate key combination. I used the help screens a lot, and in no time I could remember key combinations for wedge and NMI commands.

Programmable Function Keys

With *Super Aide* loaded into your Commodore 64, you can use any of the function keys to represent a Commodore BASIC command up to ten characters. Usually, when function keys are available, you use them to clear the screen, home the cursor, etc. I don't think I need to tell you the power of having function keys available for "personal" use on the Commodore 64. I used them in my programming exercise and found them easy to define and quick to execute.

Tutorials and Menus

When you first load *Super Aide,* you are given a few menus to look through before you exit to BASIC and begin programming. The menus and screens have good graphics and are fairly simple to follow—two things necessary to make a powerful utility usable by the programmer who doesn't want to figure out how to use the program all by himself. The manual for *Super Aide* is very helpful and, if you look carefully, you'll see that the "pages" in the manual look like screen dumps of disk-based instructions. The documentation is contained in its entirety on the disk and can be accessed when you load the program. The pages of the instructions can be printed out, so you don't have to worry about losing your manual. The presentation of material is very good and helps you to appreciate the work that went into assembling all the options on the disk.

Speed

What program is any good if it takes forever to run? The answer is simple: NONE! The "compilers" of the utilities on *Super Aide* realized this fact and made sure that every option executes quickly and, in most cases, instantly. I wouldn't say this if it weren't true, but I think that you'll pick *Super Aide* as your first choice among utility programs for its speed alone, if not also for the variety of options.

Weaknesses

So far I've only mentioned *Super Aide*'s strengths. Now it's time to get to the weaknesses. As you'll find after using *Super Aide,* it has only a couple of drawbacks—and these are very minor. Because there are so many options, it would have been nice to have an alphabetical index. Free Spirit didn't include such an option, but it might be a nice touch for future versions of *Super Aide.*

Also, *Super Aide* plays around with some locations in memory that you may already be using. Check the manual for these locations so that you are prepared for possible crashes. This isn't a drawback, just a warning. One possible location of the ML monitor is in the locations used by fast loaders. Make sure you aren't using locations of memory that *Super Aide* needs.

Summary

Overall, I was quite impressed with *Super Aide* and its ease of use. If you are a serious Commodore 64 BASIC programmer, *Super Aide* should be on your shopping list. It brings a lot of necessary and popular utility options together on one disk. I was happy with the help it gave me in manipulating my tiny program as I'm sure you will be after you use *Super Aide* for the first time.

Next Month in Commodore Magazine

TAITO: ARCADE LEADER BRINGS IT HOME

Taito recently burst into the home computer software market. Read about what their first titles offer, and what's coming next.

COMING ATTRACTIONS

A look at what's coming through 1989 and into 1990 from companies such as MicroProse, Access and Data East.

CHEAP TRICKS

Have a computer but no money? Here's how to get by cheaply.

Available on newsstands April 20, 1989.

Reviews/Arcade Game Construction Kit

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mation on submitting them for publication in Commodore Magazine.]

My last criticism concerns the manual: at 86 pages, it's a tad brief. Eighty-six pages for a game would be voluminous, but not for a game-maker with *AGKC*'s scope. Admittedly, the program is so intuitive you often won't even look at the manual. But when you do start looking, there are moments you yearn for a little more explanation. The manual is nicely written, however, and contains some excellent game-designing pointers from Mike Livesay.

These complaints notwithstanding, I recommend this product completely and whole-heartedly. It won't let you produce all types of arcade games, but it comes as close as anything I've seen or used short of machine-language programming.

If Charles Darwin was right and the species are all en route to a higher plane, then Mike Livesay has done his part to stimulate the growth of the game-designing branch of the evolutionary tree. With tools like *AGCK,* no longer will game designing be just the domain of the programmer. That bodes well for game *players* on every branch of the tree.

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN, RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the "wrong" line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line of more than 80 (or 88) characters.

"[HOME]" = UNSHIFTED CLR/ HOME
"[CLEAR]" = SHIFTED CLR/HOME
"[DOWN]" = CURSOR DOWN
"[UP]" = CURSOR UP
"[RIGHT]" = CURSOR RIGHT
"[LEFT]" = CURSOR LEFT
"[RVS]" = CONTROL 9
"[RVOFF]" = CONTROL 0
"[BLACK]" = CONTROL 1
"[WHITE]" = CONTROL 2
"[RED]" = CONTROL 3
"[CYAN]" = CONTROL 4
"[PURPLE]" = CONTROL 5
"[GREEN]" = CONTROL 6
"[BLUE]" = CONTROL 7
"[YELLOW]" = CONTROL 8
"[ORANGE]" = COMMODORE 1
"[BROWN]" = COMMODORE 2
"[L. RED]" = COMMODORE 3
"[GRAY1]" = COMMODORE 4
"[GRAY2]" = COMMODORE 5
"[L. GREEN]" = COMMODORE 6
"[L. BLUE]" = COMMODORE 7
"[GRAY3]" = COMMODORE 8
"[F1]" = F1
"[F2]" = F2
"[F3]" = F3
"[F4]" = F4
"[F5]" = F5
"[F6]" = F6
"[F7]" = F7
"[F8]" = F8
"[POUND]" = ENGLISH POUND
"[SHFT ^]" = PI SYMBOL
"[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running". Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

Have fun with the programs!

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL [RETURN] on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT . .) incorrectly. Check the line in the magazine again and check your spelling.

OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

The Magazine Entry Programs are available on disk, along with other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT 49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
1070 DATA C0,AD,03,C0,6D,05,C0,48
1071 DATA AD,04,C0,6D,06,C0,8D,0C
1072 DATA C0,68,6D,08,C0,8D,0B,C0
1073 DATA AD,0C,C0,6D,07,C0,8D,0C
1074 DATA C0,38,E9,19,90,06,8D,0C
1075 DATA C0,4C,52,C2,AD,0C,C0,69
1076 DATA 41,8D,0C,C0,AD,0B,C0,E9
1077 DATA 19,90,06,8D,0B,C0,4C,67
1078 DATA C2,AD,0B,C0,69,41,8D,0B
1079 DATA C0,A0,01,AD,09,C0,CD,3C
1080 DATA 03,D0,20,C8,AD,0A,C0,CD
1081 DATA 3D,03,D0,17,C8,AD,0B,C0
1082 DATA CD,3E,03,D0,0E,AD,0C,C0
1083 DATA CD,3F,03,D0,06,20,CC,C2
1084 DATA 4C,4B,C0,98,48,68,4C,CA
1085 DATA C0,A9,20,8D,00,D4,8D,01
1086 DATA D4,A9,09,8D,05,D4,A9,0F
1087 DATA 8D,18,D4,60,20,A9,C2,A9
1088 DATA 81,20,DF,C2,A9,80,20,DF
1089 DATA C2,4C,D9,C2,20,A9,C2,A9
1090 DATA 11,20,DF,C2,A9,10,20,DF
1091 DATA C2,A9,00,8D,04,D4,60,8D
1092 DATA 04,D4,A2,70,A0,00,88,D0
1093 DATA FD,CA,D0,FA,60,END
```

END

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>59382 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
    1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,98,30,04,C9
1041 DATA 06,30,1E,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

Amiga Software Reviews/Birds 'N Bees

Continued from page 33

Summary

The object of *Birds 'N Bees* is to provide children the sexual information they need to understand their own bodies and to stay safe—a goal it not only accomplishes, but does with taste. As a parent of two children (ages 12 and 8), I found nothing in the program I wouldn't want them to know or would object to their reading. On the contrary, I was delighted to find a sensitive program which helped me explain a difficult subject with straight talk and controls simple enough for any child to master. As a parent, I am obligated to inform my children of the realities of sex, the human body and their responsibilities toward both.

In 1989 this parental duty takes on double importance because of the increased dangers children face due to the spread of sexually-transmitted diseases, the increasing number of unplanned pregnancies and the frightening number of reported cases of sexual molestation. *Birds 'N Bees* informs without threatening and teaches without embarrassing. It is not only a well designed, excellent source of sexual information, but also bargain priced to boot. C

Software Reviews/Reach for the Stars

Continued from page 31

ogies have been increased.

What really distinguishes the Amiga version of *Reach for the Stars* are the upgraded sound and graphics capabilities. The game map can be toggled between a strategic and tactical view of the galaxy. On the tactical maps, stars and novas twinkle against the midnight of space, and colonized planets rotate, adding a touch of animation that is indeed rare in this type of game. Likewise, digitized sound effects not only spice up game play, but also give audio clues to what other players are doing. Conquest, laser battles and invasions all have specific sounds tied to them. There's even a digitized sampling of a Latin priest giving the rite de passage to vanquished players (accompanied by a rather macabre graphic panel of a bloodied, skull-ridden battleground).

Reach for the Stars can be customized very easily from the opening menu. Here you can select a multitude of options to enhance game play. Natural disasters (plague, famine, earthquake), a nova option (which destroys planets), hidden victory conditions, random star maps and advance scenarios, among a host of other items, are all available from this menu.

You may also edit movement values and production costs to make the game easier to play—or more difficult. Lastly, computer or human opponents can be designated and named, and you can select the expertise level of each computer opponent. The game can be set to run from 40 to 150 turns, at which time the winning empire will be displayed. Even then, you can continue playing indefinitely.

Reach for the Stars can be as easy or complex as you wish, and the strategic options within it seem endless at times. Because the game can be so easily customized, you won't run into the frustration factor that can be experienced with similar games, so both novice and expert strategists should feel right at home. And with the "point and click" commands, you won't have to memorize an endless list of keyboard commands.

I also own a Commodore 64 version of *Reach for the Stars* and, while it is very good, the Amiga version, with its new advanced rules and superior graphics, far outshines it. They say the third time is a charm, and I am a believer. And now that I've finally finished the last draft of this review, I can finally get back for a few more hours of "playtesting" on my own! C

Gold Mine

Continued from page 17

Whatever else you do, don't shoot the doctor or get him upset with you. You'll need him to patch you up if you get shot.
David Bennett
Fredericton, New Brunswick
Canada

Lunar Leeper: You can change levels quickly by pressing F7 and a number from 0–7.
Omar Salinas
Address Unknown

Maniac Mansion: An easy way to get past the Green Tentacle is to get the Wax Fruit from the Drawing Room (it's at the top of the stairs to the left). Then get the Fruit Drinks from the pantry and away you go! Be sure to give him the wax fruit first.
Christopher Thompson
Simpson, LA

Maniac Mansion: To get the Man-Eating Plant to grow, get the jar on the shelf before the pool area. Use the jar to get water from the pool (pool is radioactive). Give the jar with the pool water to the Plant, then give the plant the can of Pepsi.

To get the Developer that falls through the grate, you must go under the house. You do this by going outside and to the grate to the left. To open the grate use the Hunk-o-Matic machines or use the tools.
Tim Krevter
Address Unknown

Mickey Mouse's Space Adventure: Be sure to go to your house and find all the objects before going into the Spaceship. Without the objects, you won't be able to get all nine Crystals.
Nelson Yung
Winnipeg, Manitoba
Canada

Might and Magic: The Wand of Fire, Lightning Wand and the Scroll of Fire must be used on monsters, not in hand-to-hand combat. Otherwise, your men will be burned for points.
Brian Stephens
Address Unknown

Pirates: A sloop makes a great Flag Ship for any sort of captain because of its superior maneuverability. With maximum cannons and sails up in medium or strong wind, an experienced captain can sink a Frigate or even a Galleon.
Frozen Fire
Address Unknown

Platoon: Use your grenades to blow up tripwires. After blowing up the bridge, stay in the area and walk up and down the path, shooting all the enemy soldiers you see. They will leave behind supply packages, which you can use to heal all your wounded buddies. Each package heals one hit and increases your morale points.

If the enemies stop leaving supplies, try walking in and out of the dead end path on the right side as you pass over the bridge.

You may have to do this a few times to get them to leave packages again.

The path on the left leads to the village. Shoot the enemy soldier in the fourth hut and take his map. Go to the last hut to get the flashlight, but watch out for the booby trap! Finally, go back to the fifth hut to find the tunnel entrance.
Kim Cabrera
Whittier, CA

Prowler: Save a few missiles for the Hover Bases and Mother Ships. Always try to destroy the bases and Mother Ships first; if you don't, the enemy aircraft and tanks will swarm you. If push comes to shove, you can use Stingers to destroy enemy aircraft. Simply line the TADS up with the center of the bottom edge of the front window and keep firing until he explodes. Near the end of the game, you may run out of Wolfpack or Hammer missiles. Don't fret, because your air-to-air missiles can double as air-to-ground missiles just fine.
Matt McLaine
Walterboro, SC

Questron II: In this Amiga game, you can get more money without losing it by finding a city that has High-or-Low gambling. Go outside that city and save your game, then go inside and bet all your money on the first hand when you gamble. If you win, go outside and save your game again. If you lose, just reboot and try again. Save your game every time you win.
Kyle Pearson
Kansas City, MO

Renegade: If you move your man against a wall, nobody can get behind you to hold you. When you get against the wall and keep punching, the bad guys will fall like bowling pins.
Michael Cordner
Quebec, Canada

Rings of Zilfin: Before crossing over to Begonia, make sure you have lots of spices, tea, silk and tobacco for trading. Make sure that you check the rooms in the tower for secret doors. Use Horn at Sharkynn Heights.
Lance Gater
Address Unknown

Robotron 2084: Select one joystick and fire to the left continuously. Go to the right edge of the screen, move up and down, and watch the destruction begin!
Matt McLaine
Walterboro, SC

Strip Poker II: To achieve your goal on this game, Load the main program and enter LIST 6070. This line should appear:

```
6070 ZZ=2 : POKE 53274,0 : POKE 53265,43:
AA$=OP$+"1": LOAD AA$,8,1: REM A
```

Change the "1" after the OP$, to "5". It improves the game 100%.
Chad Schmitt
Address Unknown

Summer Games II: If you have a rapid-fire device, use it for the Javelin Throw. When your man begins to run, hold the button until he reaches the dot between the flags of France and Japan. Push the joystick diagonally left-back until the javelin is at about 70 degrees and release it. I've gotten over 100m doing this, and you should get past 90m.
Danny Correia
St. John, New Brunswick
Canada

Super Cycle: When you first start out on any track, wait until you hit 40 mph then hit the button to change gears. Wait until the odometer says 79, then switch to third gear. This will make you have a lower time when you finish.
Carl Bloomfield
Address Unknown

Superstar Ice Hockey: On some teams starting in the middle of the rink in the first and third period, if you just hold right you will go in and the goalie will let you go through to score a goal. Sometimes you will get knocked down or one of their guys will take the puck from you.
Chris Coe
Address Unknown

Superstar Ice Hockey: To score more goals after taking a shot, press the RESTORE key before the goalie has a chance to block your shot, then press the spacebar. This somehow disorients the goalie, allowing you to score. When you shoot using this method, lift the puck off the ice because these kinds of shots have a higher chance of scoring.
Chad Paulson
Villard, MN

Superstar Soccer: I always win many games by trading with a team in the left column of Division 1.
David Ross
Wheeling, IL

Test Drive: When you are ready to start moving in, get the motor revved up to about 6,000 rpm, then push the button and put it in gear before it winds down. With some practice you will start off at 30 to 50 miles per hour.
Glenn Moore
Berwick, PA

Top Fuel Eliminator: If the other guy blows his engine before you shift, just shift away. You'll definitely win and have less of chance of blowing up.
George Rath
Congers, NY

Track and Field: To break the record in the Hammer, listen to the swooshes of the ball. On the ninth swoosh, let it go on a 45–55 degree angle. The farthest it has gotten me is 99.94m.
Tony Heydon
Address Unknown

Ultima V: You can find the plan to the HMS Cape in Master Hawkin's room (in the NE corner of his store in East Brittany). If you use the plans while on a boat, you can go twice as fast as normal. Also, you can get Gwenno (a good Bard) to join you; he stays around Iolo's Bows in Brittan.

Finally, in many of the wishing wells you can get a horse for just one gold piece.
Bryan Bertoglio
Batavia, IL

Wasteland: Ugly's hideout is diagonal from the courthouse. The password is KAPUT. The combination to the safe is 11-16-27. Ace is in a cell behind the bar; he will fix the jeep.
Robert Mikre
Upper Montclair, NJ

Wheel of Fortune: To bypass the first menu, just LOAD "WHEEL" 8, 1. This will start loading the game from the Sharedata title screen.
Chad Schmitt
Address Unknown

Winter Games: In the Hot Dog, for 9.0–9.5 scores, do about five reverse flips, or about four forward flips. Do not share this with your opponents, and you will be knocking their hides all over the place.
Tony Heydon
Address Unknown

WWF Micro League Wrestling: If you are savage like you should be, go for a double axe handle for your first move. It works seven out of ten times.
Contributor Unknown

Yie Ar Kung-Fu: To defeat Pole, simply press the joystick down while pressing the fire button every time Pole comes near you. This works 96 percent of the time.
Rob Abramowitz
Address Unknown

Zak McCracken and the Alien Mindbenders: To learn how to use the blue crystal, go to Katmandu, Nepal, where you will see a guard. Give him the book on Enlightenment, and he will let you past the door to see the Guru. The Guru will teach you how to use the crystal.

To obtain a glowing device, go to Bermuda and get on the space ship with the pilot. He will escape from the ship by using a code on the color panels, but you should stay aboard and put on your wet suit, oxygen tank, fishbowl and parachute. Then do the codes and stand in the middle of your screen.

In a few seconds, you'll be falling from the sky; use your parachute. When you land in the water and see a dolphin, take off your fishbowl and oxygen tank and play your kazoo to attract him. Use the blue crystal to gain control over him, then go under the water and pick up the pile of seaweed. You'll see a glowing device, which you should pick up and give to Zak. It's part of the Skolarian device.

To learn to use the yellow crystal, go to Kinshasha, Zaire, and give the golf club to the Witch Doctor. After he does his dance, show him the crystal and he will teach you how to use it.
Basil Ansari
Bradford, Ontario
Canada

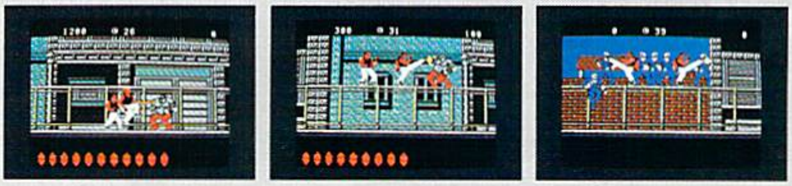
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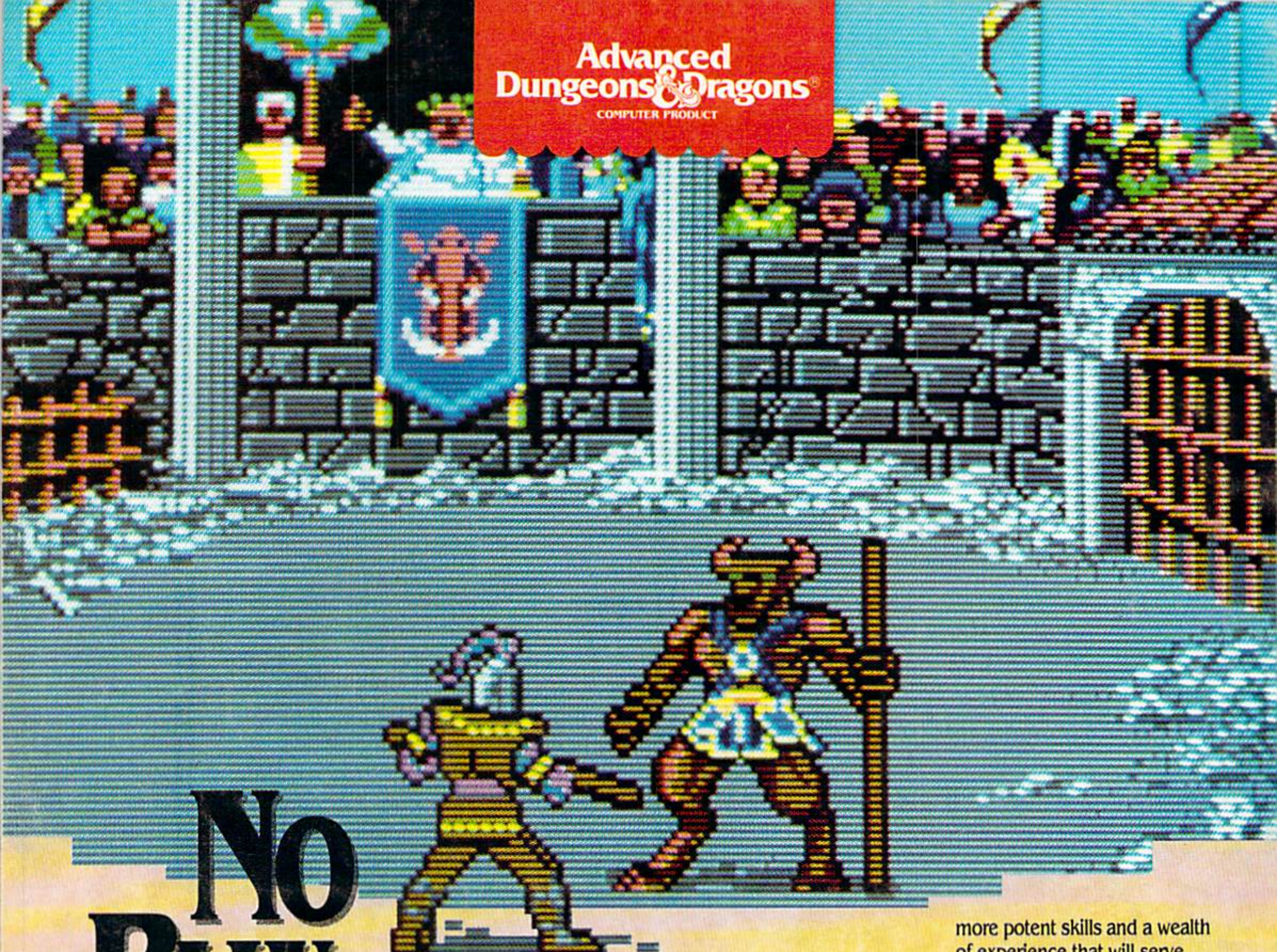
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